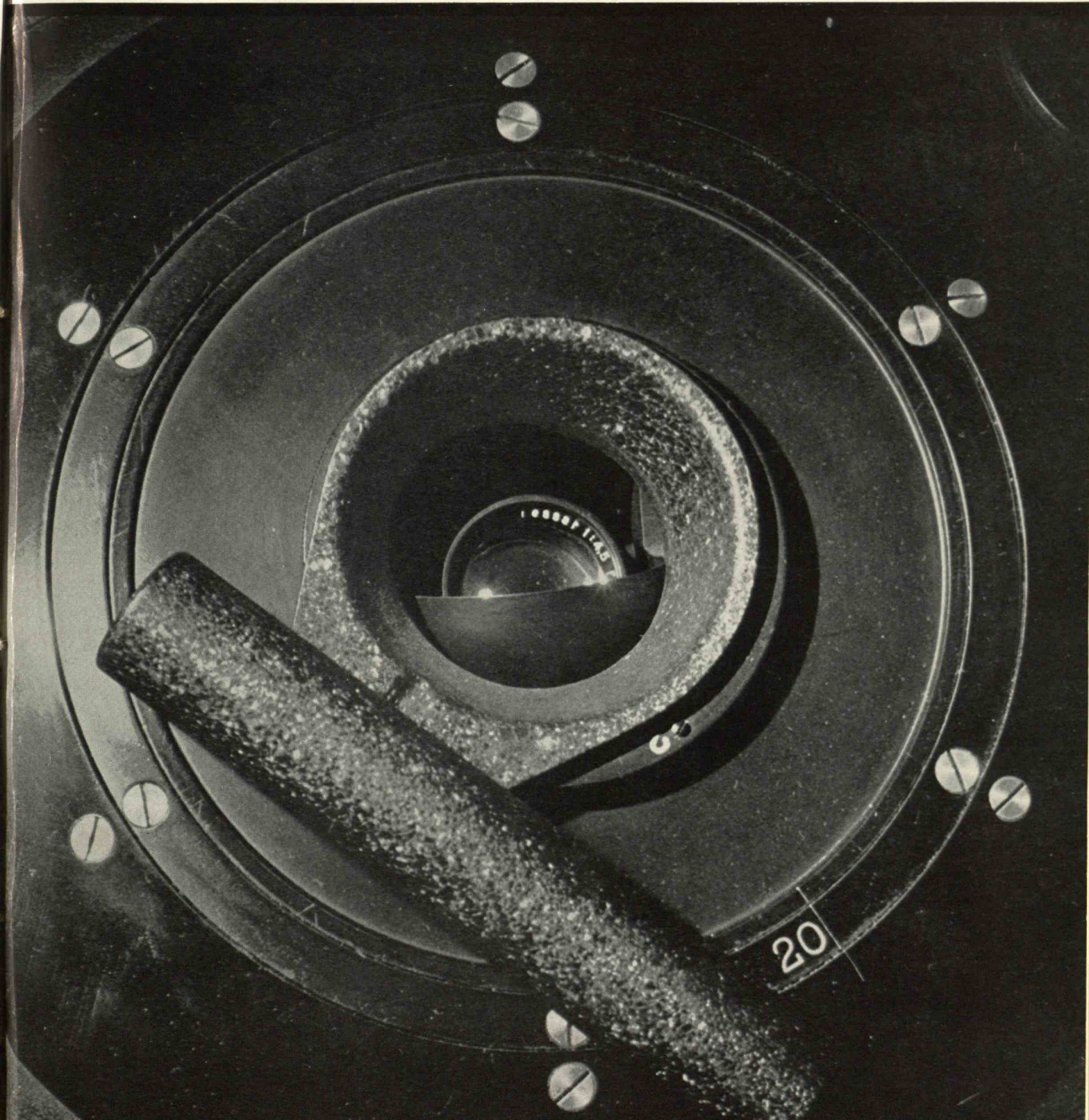


June 1945

TECHNOLOGY REVIEW

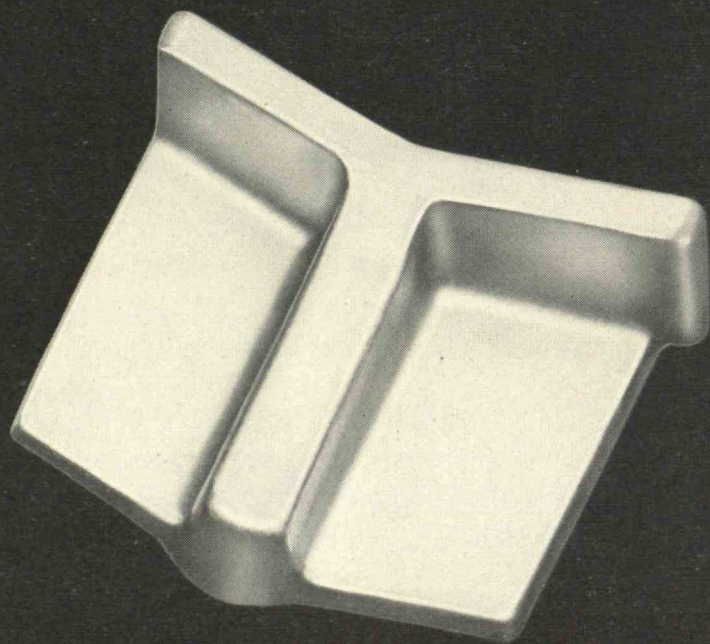
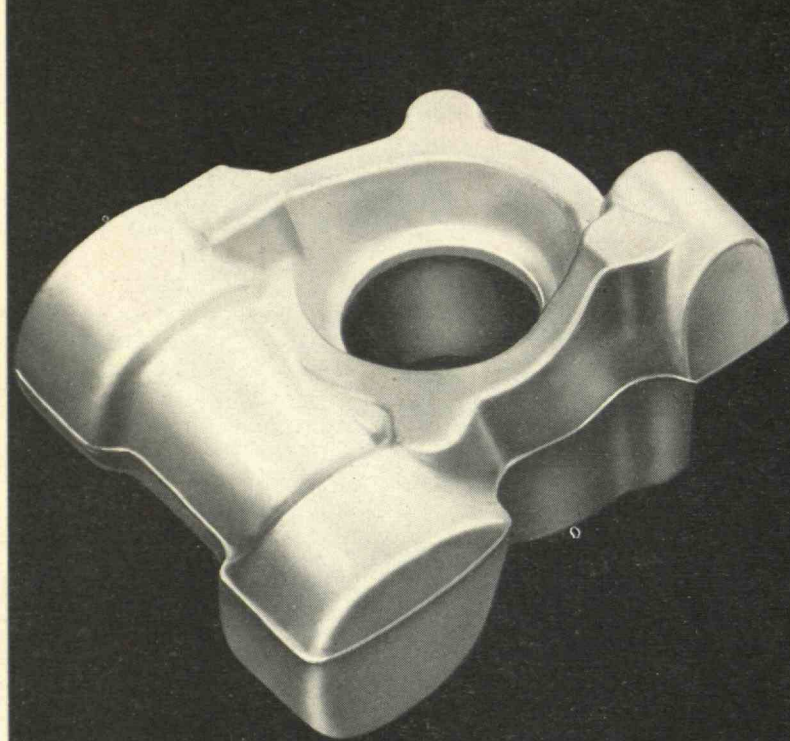
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technology review

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The eyes of your workers are constant targets for dangerous flying particles . . . unless you have an adequate eye protection program. And eyes are *expensive* targets when you consider that one eye injury can cost you more than \$1,000 in lost time, medical care and compensation.

AO Safety Goggles protect your workers' eyes . . . and protect you against lost production and increased costs. Call in an AO Representative for a complete eye hazard survey of your plant . . . at no obligation.

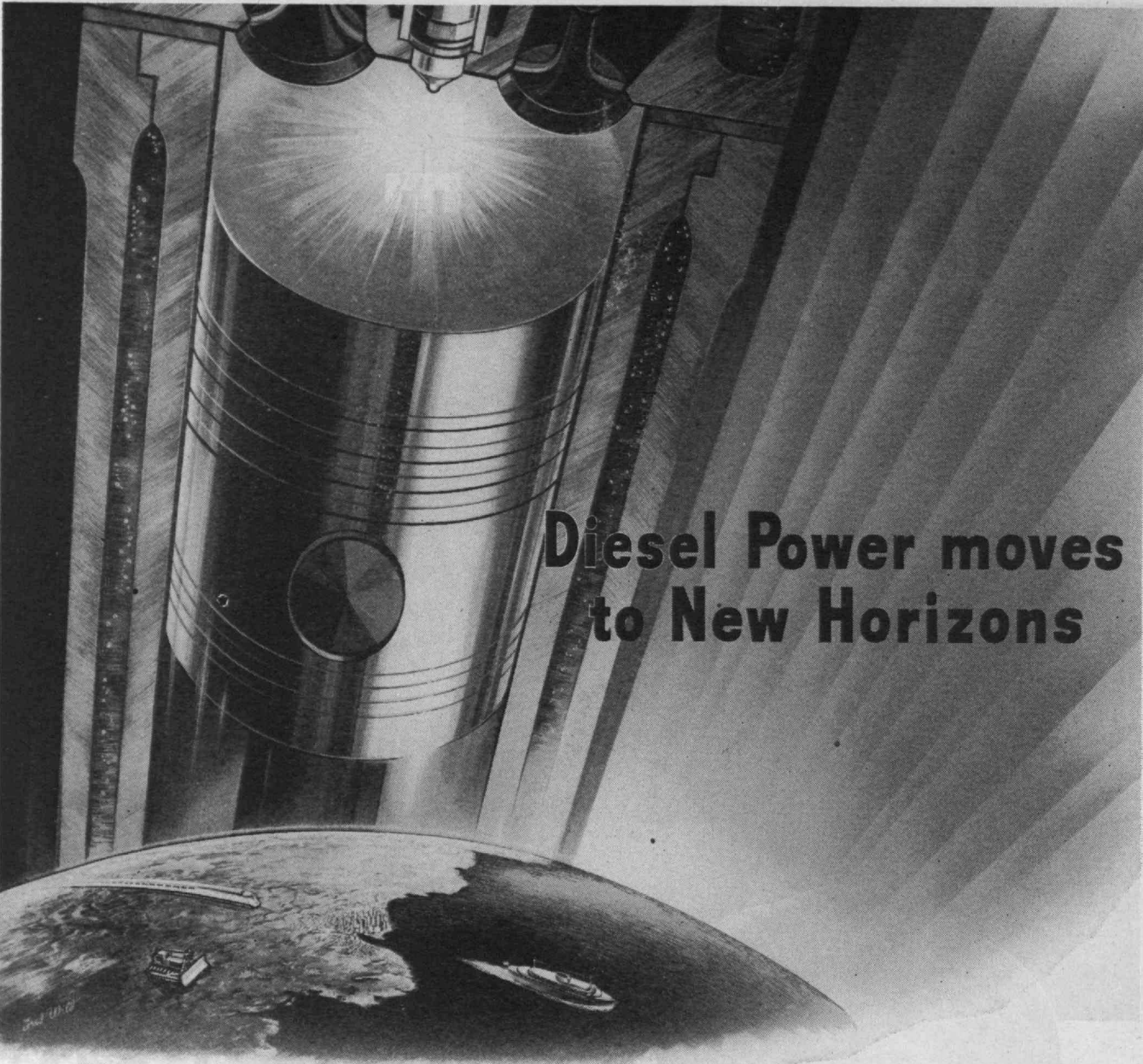


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Tomorrow, Diesel Power will speed commerce around a shrinking globe and lift century-old burdens from the backs of millions.

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America's engine builders have long since learned to come to American Bosch for the engineering skill to apply fuel injection equipment to ever-improving Diesels. Here they also find the New England craftsmanship to meet unheard of demands for precision production in quantity.

These twin skills have come to be known as "Precision Production for Power." Perhaps better than any other, that phrase describes the American Bosch of today and tomorrow.

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FOR GRINDING Hard-to-get-at PLACES

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Mounted Points
Mounted Wheels

THAT'S one of the chief uses of these Norton spindle-mounted abrasive wheels—to grind in the hard-to-get-at places on dies, molds, jigs and castings. In air or electrically operated grinders mounted in lathes, millers and other machines they are often the means of solving troublesome production problems.

Norton Mounted Wheels and Points are available in nearly 200 standard sizes and shapes—in Alundum, Crystolon and diamond abrasives—in Vitrified, Resinoid, Rubber and Fiber Resinoid (Norflex) Bonds.

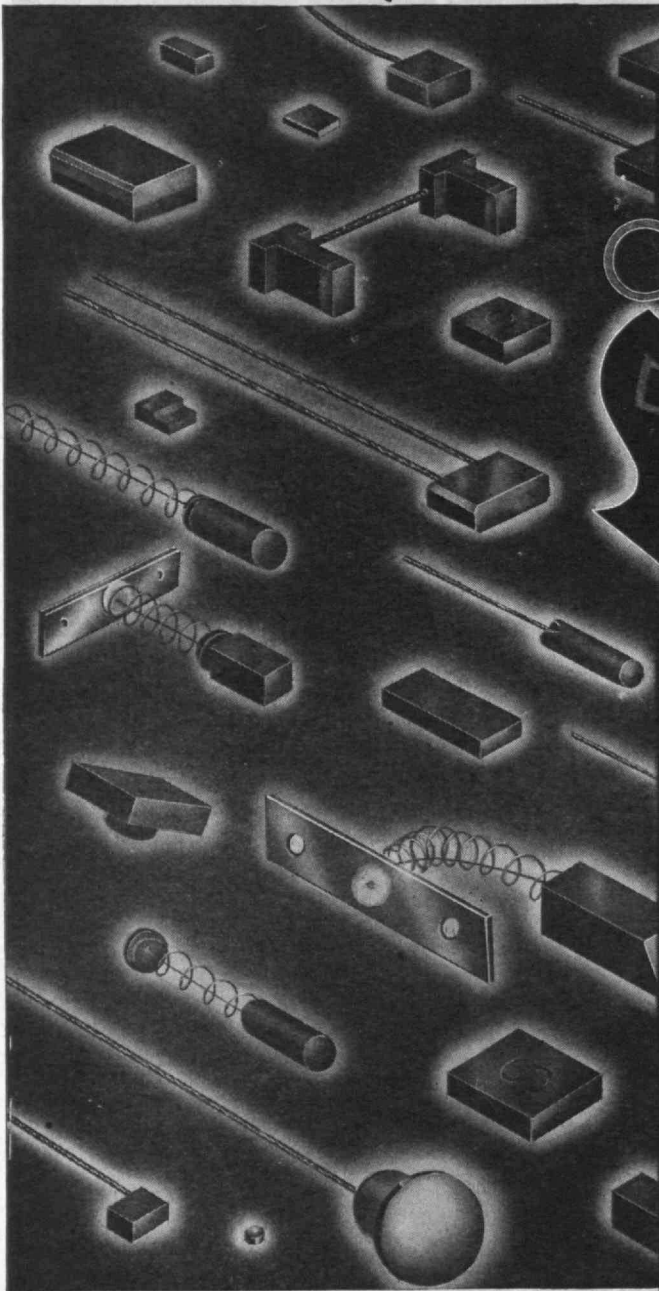
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NORTON ABRASIVES

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- **LESS RADIO INTERFERENCE**
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- **UNIFORM CONTACT RESISTANCE**
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Twenty years ago, at the suggestion of Westinghouse engineers, Stackpole pioneered silver-graphite contacts. The result was an almost immediate revolution in circuit breaker design. Later, as the advantages of this unique mix were applied to brush engineering, equally important advances were scored, particularly on low-voltage commutator and slip ring motor applications.

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(All carbon, graphite, metal,
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RARE METAL CONTACTS

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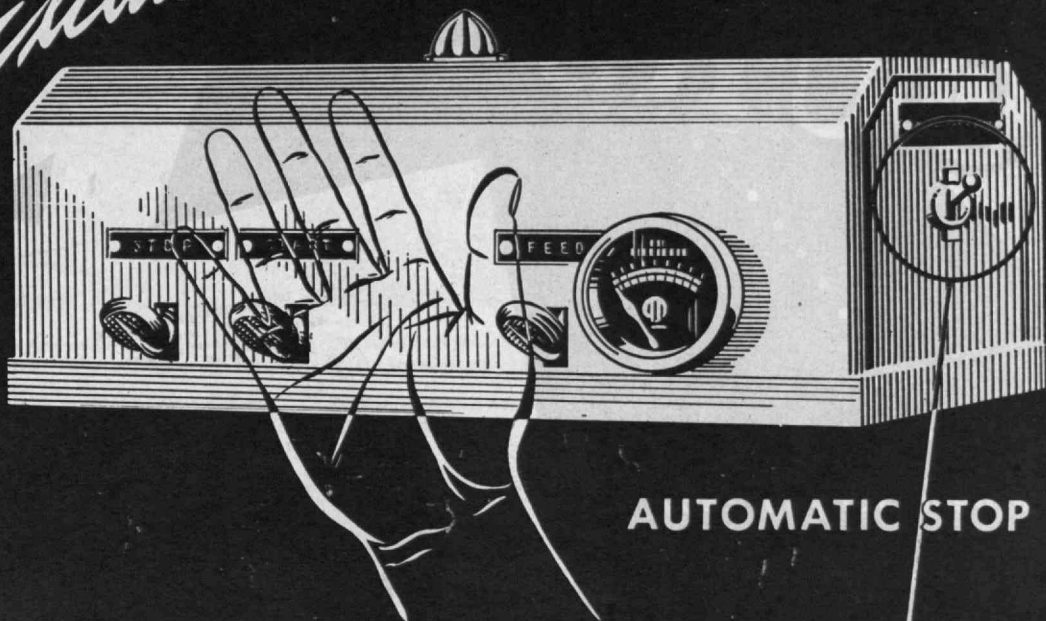
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Exclusive WITH NEW BRITAINS



AUTOMATIC STOP

ELIMINATES LOST PRODUCTION

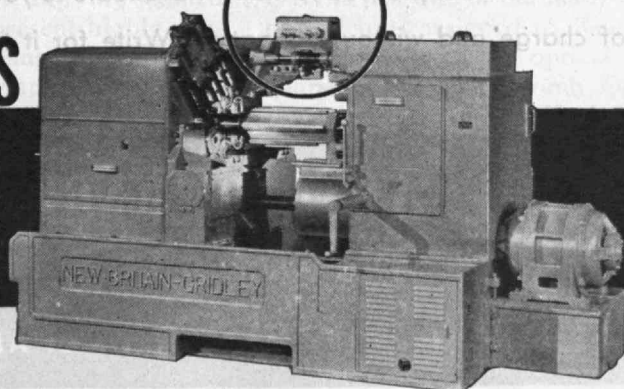
The new electric automatic stop supplied on New Britain-Gridleys is but one of the many outstanding screw machine developments of the era . . . materially facilitating the setting of tools, providing the operator with complete control and assuring the manufacturer of high production efficiency.

When stock is exhausted in any position, the stop mechanism automatically disengages the feed clutch to avert needless machining of the butt end and eliminates costly tool damage. The empty spindle is at the loading station with collet open, slides are withdrawn and a conspicuous red light signals the operator. Reloading is made simple and fast.

Manufacturers employing the most efficient and dependable methods and machines will rely on the automatic stop and other New Britain Machine features to help overcome postwar manufacturing and marketing problems. Many can be solved automatically by your nearby New Britain Sales Engineer. Let him prove how New Britains produce more . . . better and faster . . . for less.

NEW BRITAIN AUTOMATICS

THE NEW BRITAIN MACHINE COMPANY
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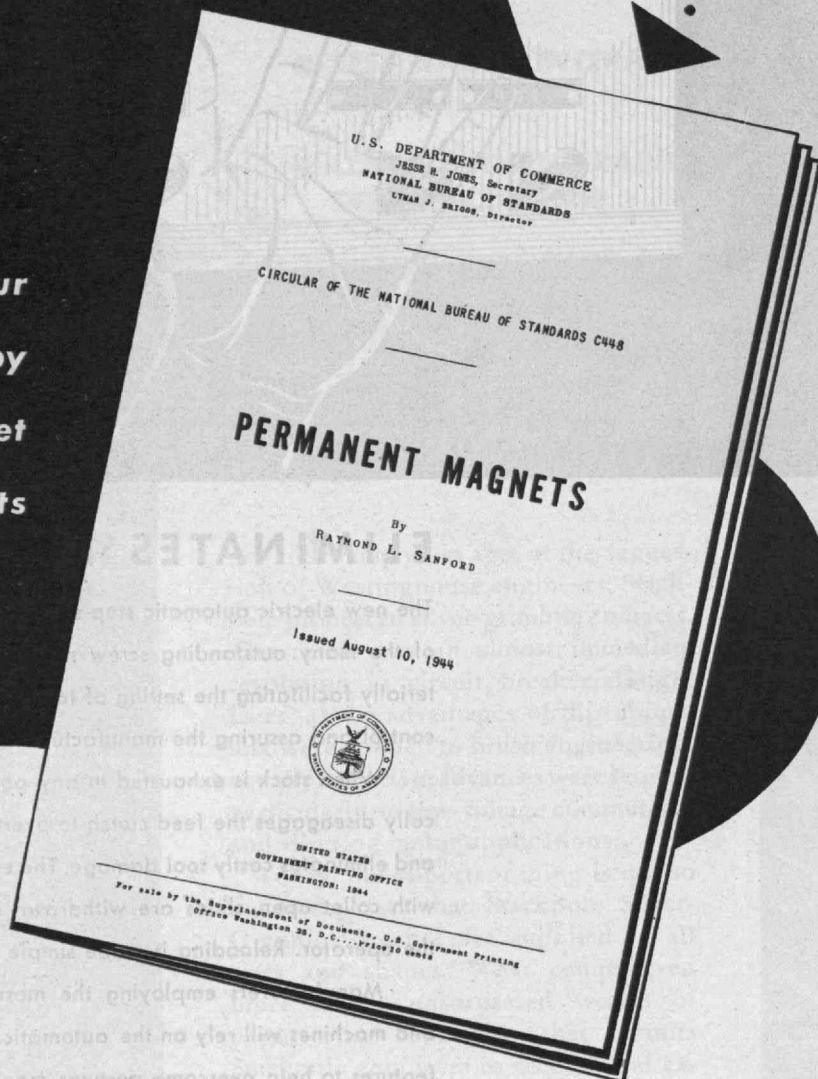


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● As a service to industry, The Arnold Engineering Company is "lending a hand" in the distribution of what Arnold engineers believe to be a very informative study on the subject of permanent magnets.

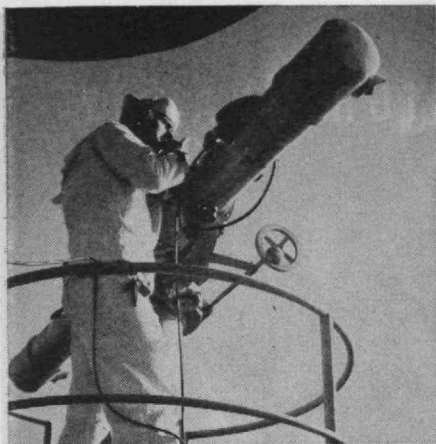
This 39-page book of permanent magnet theory, design data and references was published by the government. Arnold is pleased to make it available to you free of charge and without obligation. Write for it today!



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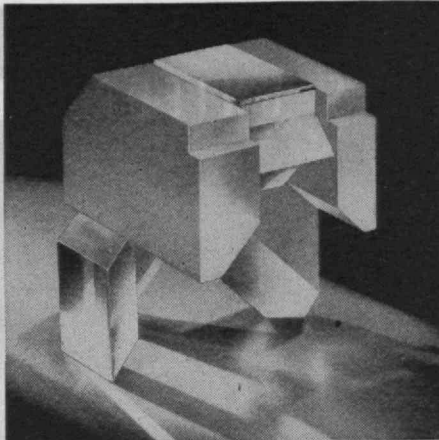
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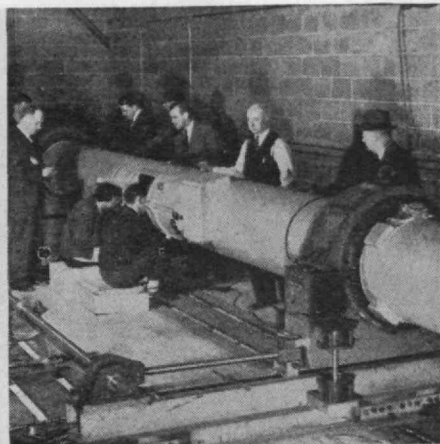
A seaman manning a 2½ meter Range Finder reports range continuously during action.—U S. Navy Photo.

In testing, the Range Finders are filled with compressed gas and immersed in water to reveal leaks.



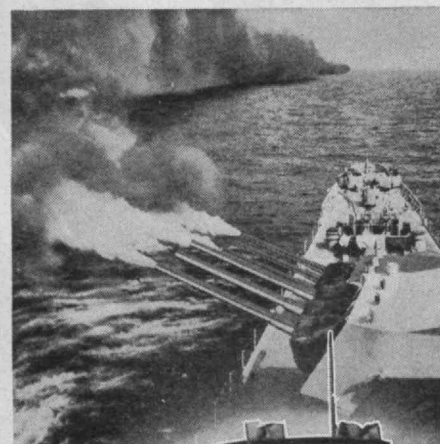
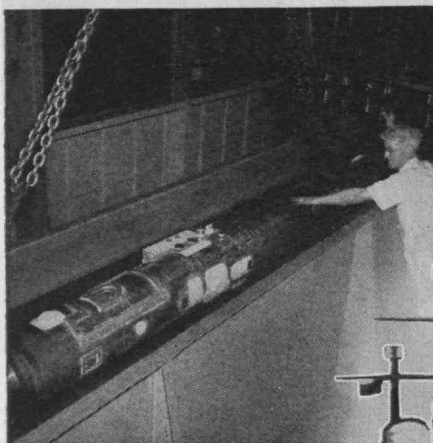
The coincidence prism shown here is the most complex of the precision optical parts in a Range Finder.

Giant Range Finders which span the battleship turrets represent two tons of precision optical instrument.

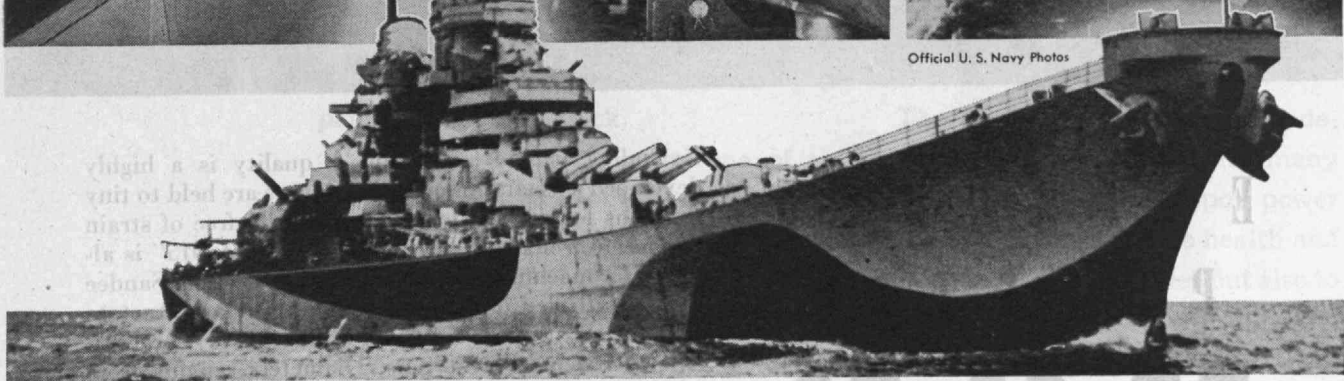


Test chamber duplicates the continuous vibration of the ship and the shock of a broadside of heavy guns.

Accurately aimed naval gunfire knocks out many enemy shore installations to make troop landings safer.



Official U. S. Navy Photos



The War's Toughest Optical Job



When the big guns of America's warships speak, the sea, the sky, and the earth tremble. Enemy shore installations and enemy ships, pinpointed by the accuracy of our gunfire, crumble even as the hopes of the aggressors have crumbled.

Creating and building the optical "eyes" that help to make possible this unerring accuracy is the war's toughest optical job. These eyes are

the giant range finders which span each gun turret and fire control tower. They represent highly complex optical systems, so precise that the allowable deviation of some parts is but one-half second of arc, equivalent to 1" at 6½ miles—systems so rugged that accuracy remains constant under the shock of thundering salvos and continuous ship vibrations.

The production of these giant optical instruments in the quan-

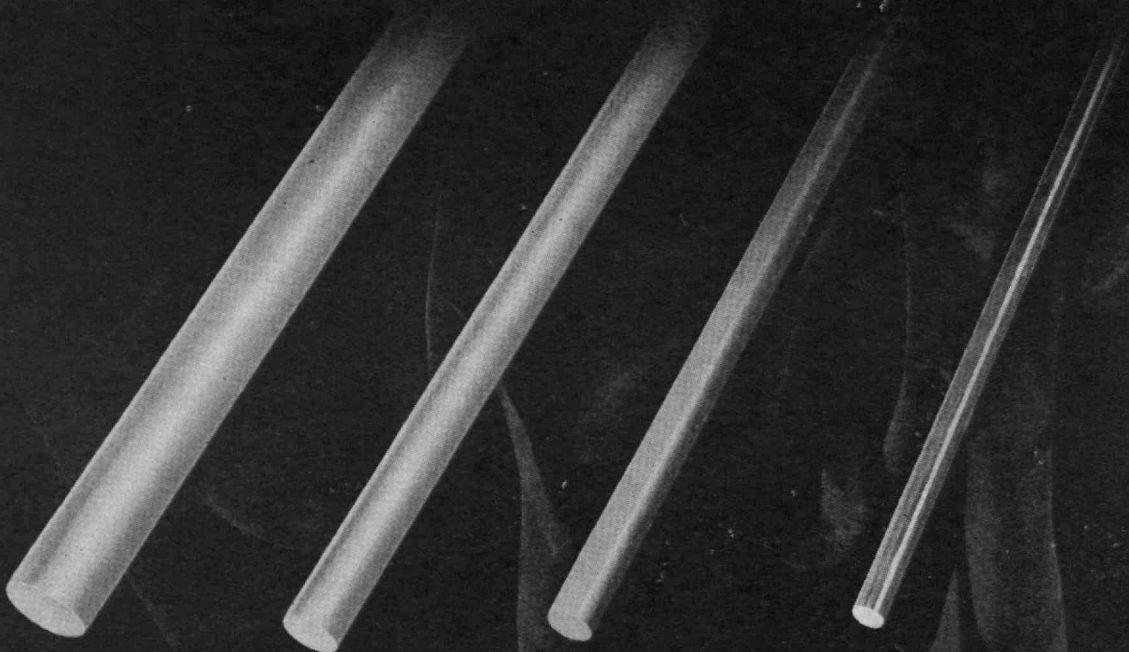
ties needed by the world's greatest Navy is just one of the many tough optical jobs assigned to Bausch & Lomb . . . America's optical headquarters. Bausch & Lomb Optical Co., Rochester 2, New York.

BAUSCH & LOMB

ESTABLISHED 1853



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Elmer Szantay, M.E. '35, General Manager

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"SECRET WEAPON"

NOT the latest thing in super-tanks capable of mounting long-range guns, but—believe it or not—complete steam generating units, each accompanied by its own stack.

These units, now leaving one of *Combustion Engineering's* plants on an almost daily schedule, are on their way to distant devastated areas where they will serve to restore critically needed power facilities.

The field erection and placing in service of steam generating units normally is a matter of months. *Combustion* designed these units to reduce this all-important time factor to a matter of hours. All that has to

be done is to swing the unit into place; make the steam, water and electrical connections; fill the boiler; fire up the stoker; and start making steam.

The quick re-establishment in devastated communities of the many vital services dependent upon power is essential not only to the health and safety of such communities but also to the full restoration of their ability to aid in defeating the enemy. Thus these "wrapped-up and ready-to-use" C-E Boiler Units will contribute importantly to the final stages of winning the war. After that they will help in establishing living standards that will aid in winning the peace.

A-865A

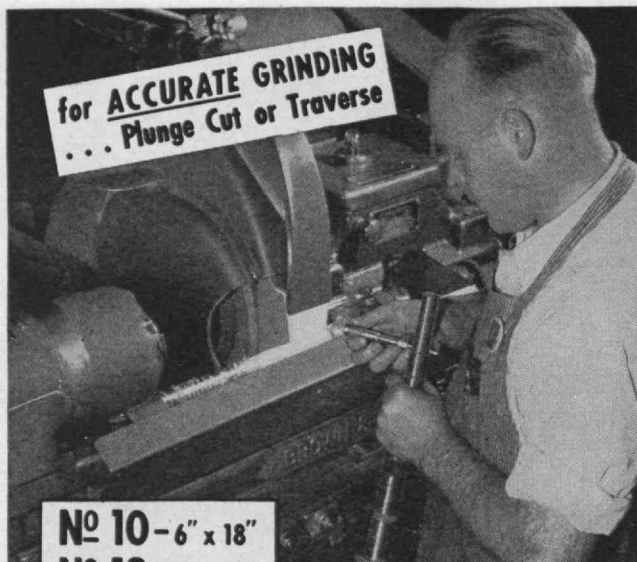
C-E INSTALLATIONS span the entire range of steam generating requirements from small stoker-fired boilers of less than 50 horsepower to the largest power station units.



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MACHINES

Convenient Time-saving
Controls promote
fast production

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Smooth Vibrationless
Operation at all
table speeds

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- A well established medium-sized engineering and manufacturing firm, experienced in solving engineering problems and in building equipment for the Textile, Food, and Chemical Process Industries, would welcome the opportunity to consider new ideas for standard products. This company would be interested either in purchasing new products or assisting in their development and commercialization.
- The majority of the engineers and executives in this firm are M.I.T. men who would anticipate the pleasure of working with you in the development of new products. All replies will be treated in the strictest confidence.

Reply to Box C

THE TECHNOLOGY REVIEW

M.I.T., Cambridge 39, Massachusetts

THE TABULAR VIEW

Verified. — From the skillful typewriter of the genial FRED C. KELLY, this Review presents (page 484) a document of great interest in the annals of aviation. It is, published for the first time, description and explanation of the ingenious devices which Orville and Wilbur Wright contrived to record the actual performance of the airplane in which at Kitty Hawk on December 17, 1903, they achieved for the first time mankind's agelong hope for flight. Orville Wright has been generously helpful in giving the facts for this account, has made photographs of the installation available, and has made an offhand sketch showing how he and his brother solved this pioneer problem.

Advancing. — Varied needs and rich resources are offered for engineering and science in postwar years by the American empire of the North. The war has occasioned large-scale approach thereto, as in the Alcan Highway and the Canol development. Discussing these and other aspects of Alaskan possibilities, RICHARD FINNIE, who served as historian and consultant to the Corps of Engineers on the construction of both projects, presents a summary view (page 487) of future opportunities.

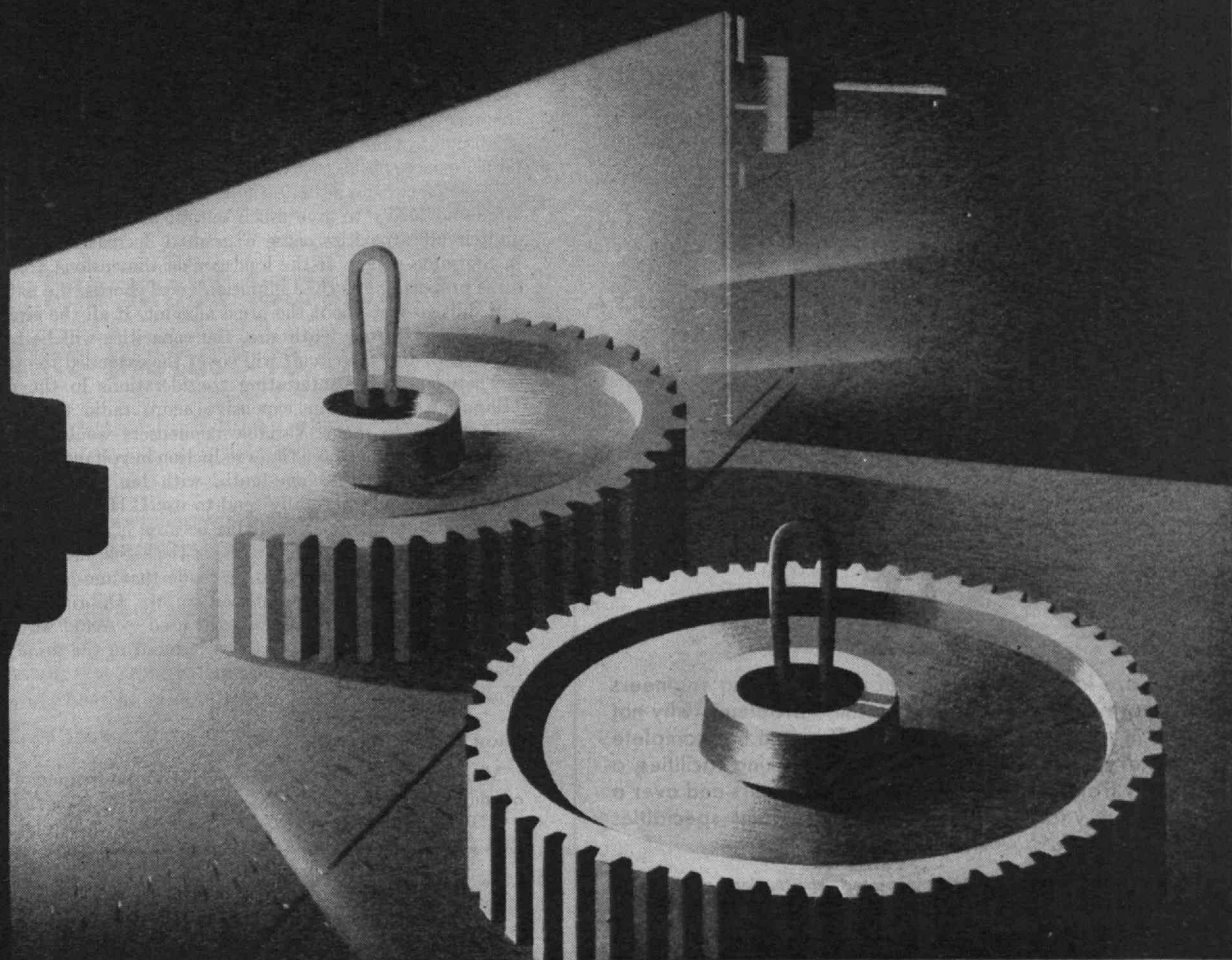
Lifeblood. — How French engineers and scientists kept the lamp of research alight, experimented, studied, discussed, and published even while the Germans occupied Paris and clamped censorship on free expression is described in this Review (page 489) by ROBERT G. L'HERMITE, Director of the Laboratory of Building and Public Works in Paris. M. L'Hermite's article includes the impressive bibliography of research papers which his group issued in spite of German bans.

Evoke. — The art of photography has not yet attained full maturity, and from it new and greater riches are to be had, contends L. MOHOLY-NAGY, President of the Institute of Design, in an essay (page 491) drawn from his volume, *Vision in Motion*, soon to be issued by Paul Theobald, Publisher, Chicago. Painter, designer, and stimulating teacher, Mr. Moholy-Nagy was associated with Walter Gropius in direction of the famed Bauhaus at Weimar. His Chicago school is a center for advanced design studies.

Tell. — In a related article, the instructive power of photography is discussed (page 495) by F. W. GORO, whose utilization of the camera to make science comprehensible and accustomed through the pages of *LIFE* Magazine has been consistently notable since he joined the publication in 1937. A student at the Bauhaus, Mr. Goro set out to be a sculptor but became a magazine art director, serving the two largest pre-Hitler German picture magazines in that capacity. His career in professional photography began in Paris in 1933. He was the principal photographer in *LIFE*'s memorable picture-story on color last year.

Exit. — The present Editor here concludes active direction of The Review, with appreciation to readers, authors, and collaborators who have made the past six years a pleasant interlude, and with every good wish to his successor, who brings to the editorial desk a combination of enthusiasm, acumen, and ability assuring both that he will find great satisfaction in his work and that he will carry the magazine to new levels of attainment.

Molybdenum steels require relatively high tempering temperatures and therefore are relatively free from internal stresses.

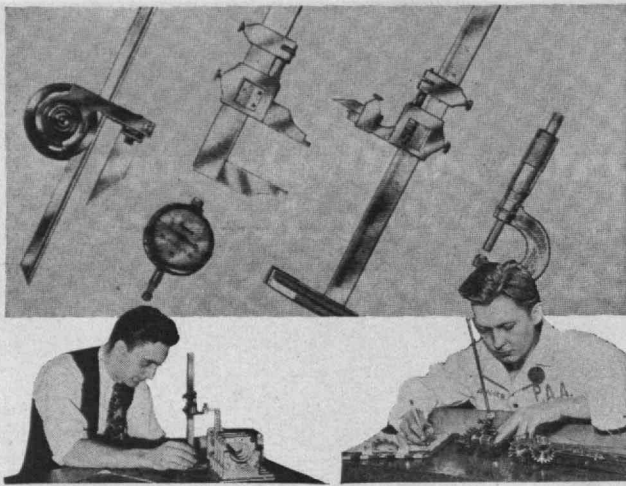


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Your skilled workers will appreciate the unerring accuracy, precision construction and superb design of Starrett Precision Measuring Tools. They'll do their important checking and measuring swifter, surer and with more confidence using Starrett Tools—the tools they can trust.

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you are looking for a firm of manufacturing engineers to work with you on a new machine problem—why not get in touch with Rodney Hunt? This firm has complete foundry, metal-working and wood-working facilities, a highly trained staff of supervising engineers and over a hundred years' experience. Rodney Hunt specialties are:

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MAIL RETURNS

On "Lilliput Revisited"

FROM MORLEY J. LUSH:

I find your magazine interesting and stimulating to people of engineering background. The copies which reach me are circulated among several engineers who have no connection with M.I.T.

The article "Lilliput Revisited" in the March issue was most interesting, although I do not agree with all of the conclusions reached. I believe the question of Lilliputian visual acuity is considerably more complex than was indicated. Some birds are known to have better vision than humans although their eyes have a smaller iris diameter. In addition, camera enthusiasts will tell you that almost any camera will give much sharper pictures as the iris is made smaller, not larger. There is no denying that diffraction is a limitation on resolving power, but it is questionable that it is the chief limitation on visual acuity.

Mr. Dobrin made the statement that Lilliputian telephones and radios would be elaborate and expensive because of the extended high-frequency response which would be required of them. This is only a small point in the article, but I believe it is a real error. It is expensive for us to make radios to give flat response at the higher audio frequencies because of two main limitations. Our loudspeaker diaphragms are too large and heavy to give much output at these frequencies, and tube and circuit capacities cause a gradual decrease in amplifier response in the same region. If the loudspeaker dimensions are reduced in the same proportions as the Lilliputian vocal chords, the natural frequency will shift to just about the same amount. If all the circuit dimensions are reduced to one-tenth size, the capacities will be reduced to one-tenth also, and the circuit will cover the extended frequency range.

There are other interesting considerations in the construction of Lilliputian radios. Our expensive acorn radio tubes would be just natural size to them. Variable condensers would be only one-tenth capacity (including a ten times reduction in voltage rating). Inductances would be reduced to one-tenth, with ten times normal resistance. The radios would naturally tend to use U.H.F.'s but there would not be many more channels available because of the reduced circuit Q and lower selectivity, and also because of the higher modulation frequencies.

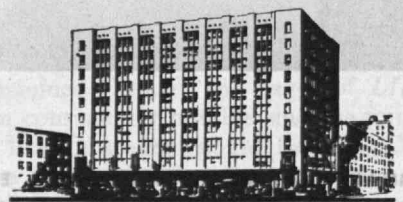
A general statement could be made that most of the objections to the Lilliputian world, as outlined in Mr. Dobrin's article, would be eliminated if all of the wavelengths used—sound waves, light waves, and radio waves—were all to be reduced in the same proportions as the reduction in linear dimensions.

Watertown, Mass.

FROM MILTON B. DOBRIN, '36:

Mr. Lush's penetrating analysis of audio-frequency and radio-frequency apparatus in Lilliput is entirely correct (*Concluded on page 526*)

**Speed with
Economy**



R. C. Williams & Co.

Approximately 70% of our annual business comes from former clients—a continuing evidence of service well rendered.

W. J. BARNEY CORPORATION
101 PARK AVENUE, NEW YORK
INDUSTRIAL CONSTRUCTION

Alfred T. Glasett, '20, Vice President

The most important part of this picture is the **FLAME**

THE ENGINES of high-flying planes "breathe" in rarefied atmosphere by means of the turbosupercharger which supplies them with air.

The turbosupercharger—a small, high-speed turbine-type air compressor (see sketch below)—is driven by the energy in the exhaust flames from the plane's engines.

Driving turbines by gas flames has been a dream of engineers for many years. However, they had to wait for the metal parts that would remain hard and strong enough to withstand the wear of flaming heat at terrific speed.

Alloys that are strong even when red hot and, at the same time, adequately resistant to corrosion and wear were developed more than 20 years ago by HAYNES STELLITE COMPANY, a Unit of UCC. All these years the ways to shape any but simple parts of these "red-hard" alloys have been too slow and costly for mass production. Now Haynes Stellite has perfected a new technique for making cast precision parts by the millions and this has made turbosuperchargers possible and practical.

Gas turbines, jet-propelled planes and similar important scientific developments are making swift strides now because this Unit of UCC gives engineers mass production of precision parts that remain strong, hard and wear-resisting even when red hot.

▼
Engineers, designers, and teachers are invited to send for booklet P-6 "Tables of Physical, Mechanical and Chemical Properties—Products of Haynes Stellite Company." There is no obligation.

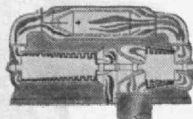
THE TURBOSUPERCHARGER
*a 150-pound mechanical lung
for airplanes.*



JET-PROPULSION PLANE
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*What's going to happen to the **SUZY Q?***

Remember the graveyard of rusting ships after the last war? For years a grim reminder of surplus war production, they also represented a practically bankrupt shipbuilding industry.

Today, America's aircraft industry accounts for a substantial proportion of our total national economy. That industry has produced more than a quarter of a million planes since Pearl Harbor! Its plants, equipment and production represent 50 billion dollars worth of taxpayers' money.

Here is the most valuable single peacetime legacy of war. . . . Here is power to maintain peace, insure our national security and provide jobs for millions of Americans . . . And here is a critical problem.

For the percentage of profit earned by our aircraft industry is so low that its entire capital reserves amount to only a few days' operating costs! The lack of a sound national airpower policy could actually result in the collapse of a great industry and the promise it holds for the whole world.

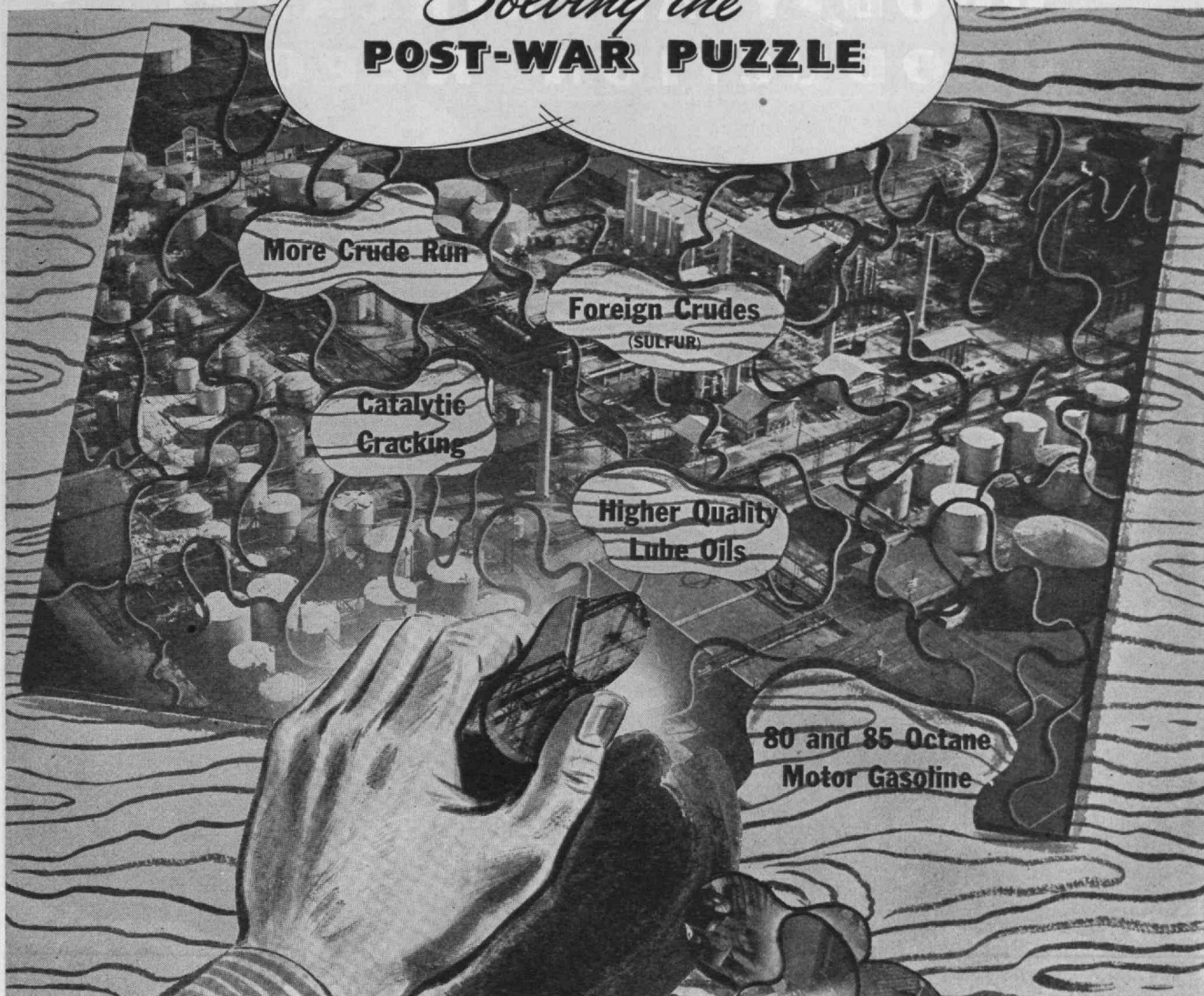
We at Bryant know that we can sell many machine tools to a healthy peacetime aircraft industry. But far more important — those tools mean jobs, and our last chance to enforce peace throughout the world.



BRYANT CHUCKING GRINDER COMPANY

SPRINGFIELD
VERMONT, U.S.A.

Solving the POST-WAR PUZZLE



Swiftly but clearly the post-war picture is taking shape — refineries will have to run more crude, including foreign crudes of high sulfur content . . . a greater quantity of gasoline and distillate fuels will be required . . . there is every indication that regular motor gasoline will go to 80 octane, premium grade, 85 octane. Handling reduced crudes for catalytic cracking stocks with the production of coke, fuel oil or asphalt depending on the market, the demand for more lube oils, particularly those of higher quality, more solvent refining and dewaxing, the production of chemicals from petroleum raw materials — these and other post-war problems call for careful planning now.

To the refiner who is planning for profitable post-war production, Lummus offers the collective experience of a designing, engineering and construction organization that has been responsible for many outstanding installations — catalytic crackers, polyform plants, 100 octane plants, thermal cracking plants, topping units, a large proportion of the

world's solvent refining and dewaxing capacity, and complete lube oil plants. With its experience in butadiene, the world's largest butadiene (from petroleum) plant, styrene, phenol, toluol and explosives, Lummus is particularly well-equipped to design and construct petroleum chemical plants.

Let Lummus cooperate with you in the development of your most profitable post-war operations utilizing the best available process methods.

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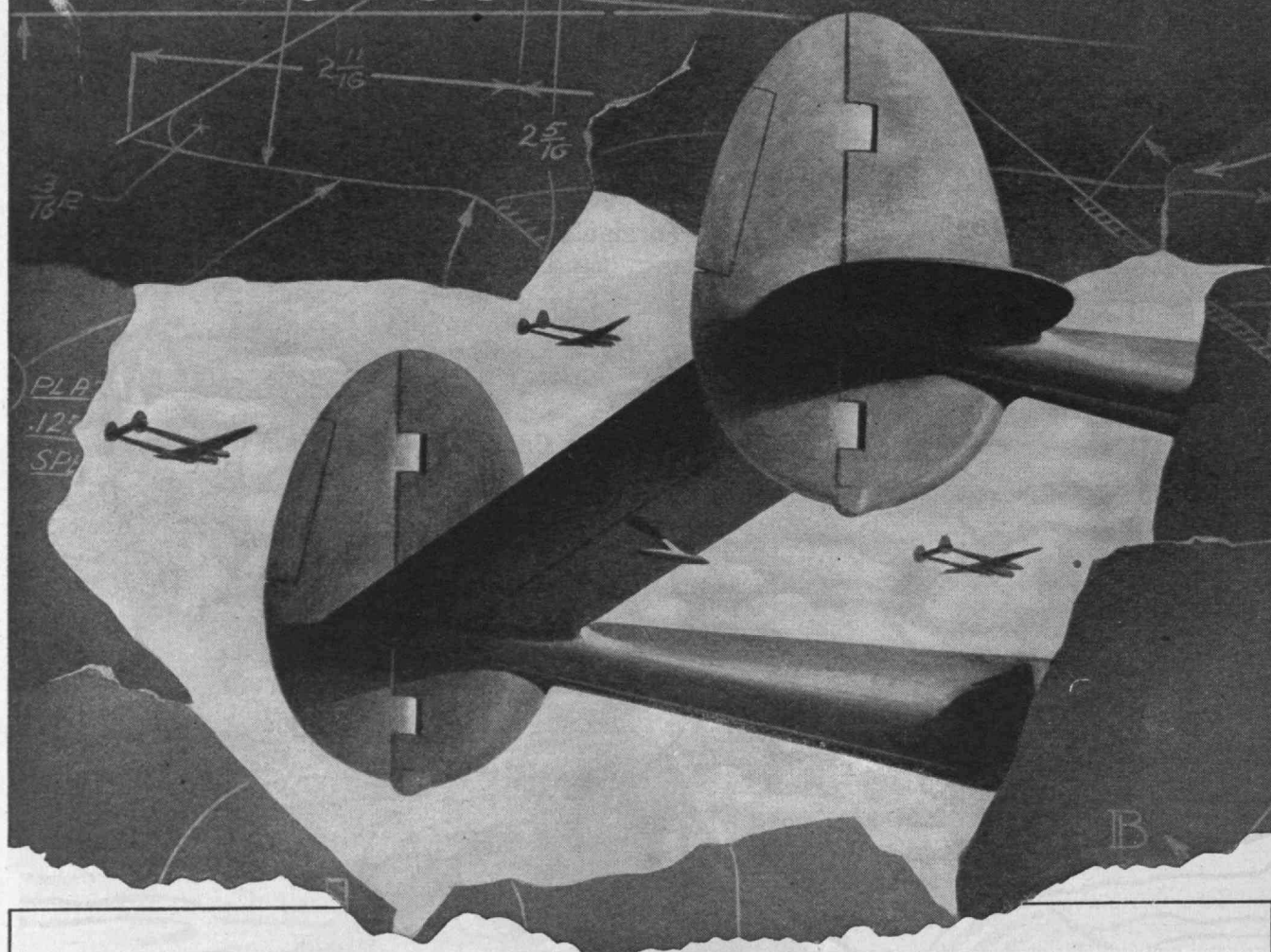
Mellie Esperson Bldg., Houston 2, Texas

634 S. Spring Street, Los Angeles 14, California

LUMMUS

PETROLEUM REFINING PLANTS

GOOD YEAR AIRCRAFT PRODUCTION REPORT



CONTRACT: W535AC40040
LOCKHEED P-38
(Lightning)
COMPLETE EMPENNAGES

CONTRACT RECEIVED: MARCH 1944
FIRST PRODUCTION UNIT DELIVERED: JULY 1944
450TH PRODUCTION UNIT DELIVERED: JANUARY 1945

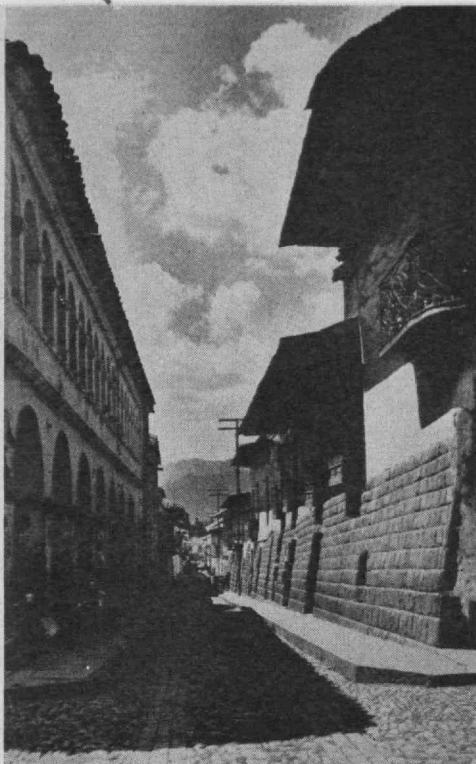
REMARKS: Working in close cooperation with Lockheed, Goodyear Aircraft used their resources to meet the production requirements for this effective fighter by manufacturing the necessary tools, dies, jigs and fixtures, and quickly produced interchangeable components in quantity. In fact, six months after the first unit was delivered, Goodyear had produced more than 450 sets. Aircraft experience extending back over more than three decades, proved a sure foundation for the many tasks involved in producing components for this twin-tailed fighter which strikes fast, hard, and with deadly fire power.

Goodyear is building components for sixteen different Army-Navy types of aircraft, including complete Corsair fighters and airships.



GOODYEAR AIRCRAFT CORPORATION, Akron, Ohio

Litchfield Park, Arizona



A Street in Cuzco, Peru

THE TECHNOLOGY REVIEW

TITLE REGISTERED U. S. PATENT OFFICE

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AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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From a photograph by F. W. Goro for LIFE Magazine

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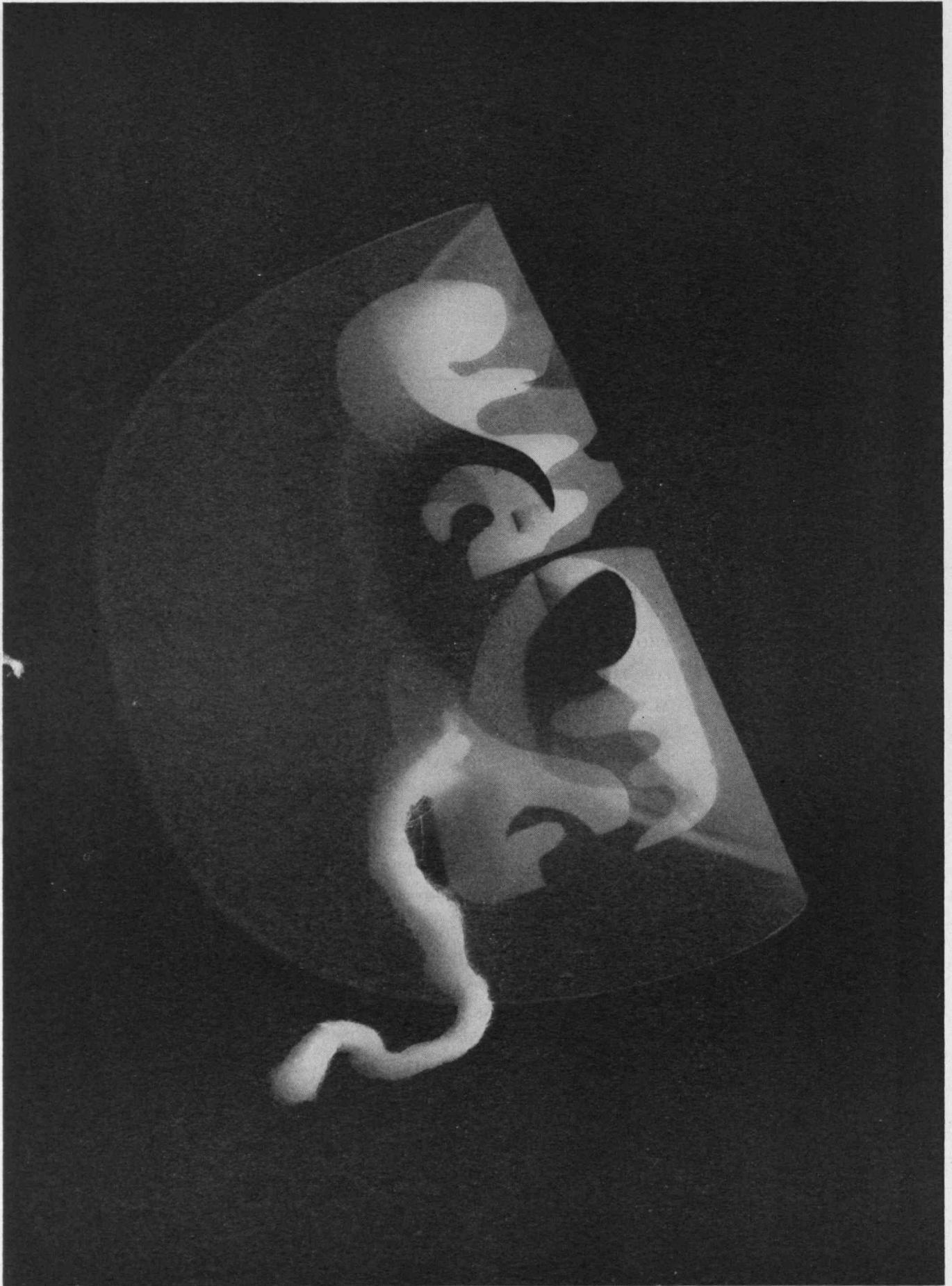
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Photogram 40

(482)

THE TECHNOLOGY REVIEW

Vol. 47, No. 8



June, 1945

The Trend of Affairs

Artificial Halo

NO sonnet now upon milady's eyebrow, but the subtleties of science expended on the undulations of the damsel's tresses. The structure of organic molecules, their reactivity, the latest speculations on the inner texture of fibers, and substances synthesized from ethylene gas, by-product from the manufacture of gasoline by the cracking of petroleum — all these are applied in the ingenious "cold wave" process whereby the hair is given a permanent crimp without recourse to heat. After the fact it is difficult to determine whether theoretical considerations produced the process or, the process having been worked out empirically, it was found to submit beautifully to scientific explanation. At any rate, the cold wave sends its roots into the profundities as deep as many a million-dollar triumph of modern chemistry.

Hair is a protein fiber, a bundle of long protein molecules intertwined with one another and linked together crossways at intervals. In the cold wave process, the cross-links are broken, the fibrous bundle is bent to the shape which is to be permanently imparted, and cross-links are established again by new combinations of the parts of the original cross-linkages. As simple as that: The new linkages hold the bundle of molecules in the new shape.

Proteins are condensed amino acids, long molecules formed by the linking together seriatim of amino acids, the acid end of one molecule being condensed with the amino end of the next, and so on, and so on. The amino acids are alike in the respect that they all contain an acid group and an amino group, but they are not all alike in certain other details of the arrangements of their atoms. One of them in particular, cystine, which constitutes about 15 per cent of the protein of hair, is made up really of two amino acid molecules linked together crossways by a bridge or link of two sulphur atoms. Every cystine residue in a protein thus establishes one cross-link between two series of condensed amino acid molecules. Another

cystine residue may cross-link the two series in another place or it may link each of the series independently to another one. The cross-links each grasp only two of the ultimate units of the fiber, but the links are so numerous and so well distributed that they give the bundle a certain pseudorigidity of its own, a resiliency, a shape to which it returns of itself when released from any stress which may have distorted it.

Cystine is split by the action of appropriate reducing agents; the sulphur-sulphur linkage (-S-S-) which holds together the two halves of its molecule is opened up, hydrogen atoms are introduced forming -SH groups, and two molecules of cysteine are formed. The same thing happens to the cross-links of the hair fiber under the action of such materials as sodium sulphide, beta-hydroxyethylmercaptan, ammonium thioglycollate, and so forth. These are depilatories which soften the hair and, if allowed to act long enough, finally disintegrate it. Also, their offense is rank; they smell to high heaven. For cosmetic use they require to be camouflaged by perfumes which cover their disagreeable odors until art's hid causes are no longer found, and all is sweet, and all is sound — at least as far as the chemistry is concerned.

Suitable oxidizing agents convert cysteine back to cystine; the hydrogen atoms are removed from the -SH groups, and the sulphur-sulphur linkage is restored. Hydrogen peroxide and sodium perborate are benign oxidizing agents which have been used to restore the cystine linkages in hair which has been softened by depilatories.

The essential steps in the official cold wave process are about as follows. The hair is first washed thoroughly with a detergent solution containing an effective wetting agent either with or without a quantity of a depilatory material. This is to remove any oils or fatty substances which would tend to inhibit the softening process and, perhaps also, to produce a preliminary and partial softening. The hair to be waved is then wound on pegs where it is held in place by little clamps, and now it is treated, while under stress, with the agent which opens up the cys-

tine linkages. The operator at this point sometimes tests the action of his solution on a selected sample of the hair in order to determine how long it is desirable to let the solution act. When the hair has been softened sufficiently, it is treated with the oxidizing material which establishes new cystine linkages at the places which have been brought into juxtaposition by the winding on the pegs. The hair is then unwound from the pegs, washed thoroughly, and thereafter treated as the taste of milady may dictate.

By the cold wave process nothing is added, that is, nothing material, nothing except that immaterial and elusive something: She's gorgeous! She's enchanting! and so forth. Nothing is taken away, not even an atom. The original atoms have been coerced by chemistry into new arrangements giving the hair a new and enduring sinuosity.

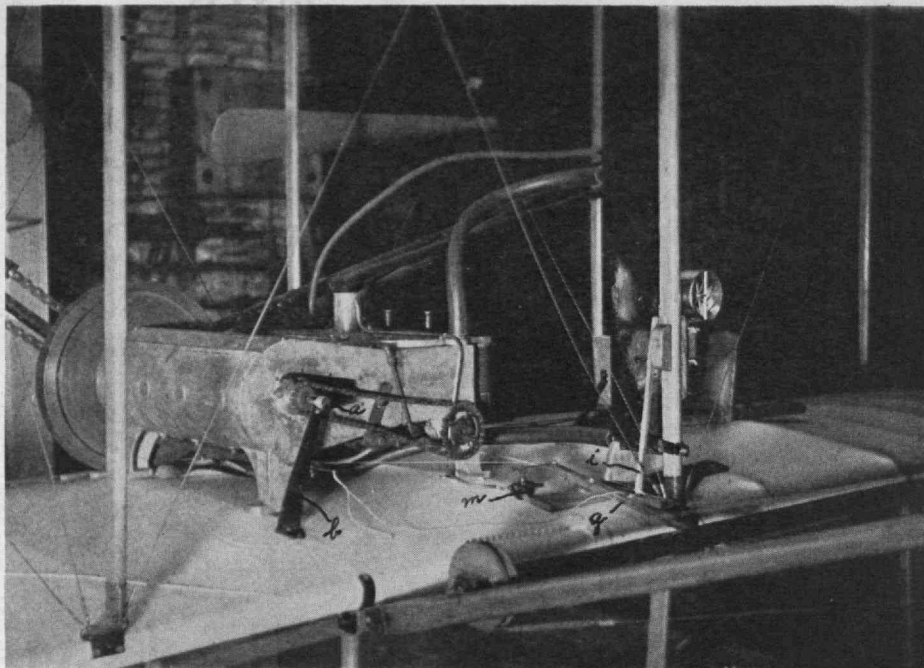
For the Wright Record

BY FRED C. KELLY

DOZENS of writers have told how "excited" the Wright brothers were when their Kitty Hawk plane made the first successful flight, on December 17, 1903. The truth is that the Wrights showed not the slightest trace of excitement. Their quiet composure is understandable, inasmuch as the plane did just about what was expected of it. With faith in their calculations and with no doubt that the machine would fly, they were not surprised when it did fly. So sure were they of flying that they made painstaking arrangements for recording certain details of the machine's performance.

Devices on the plane for obtaining data with which to check the soundness of their propeller theories were contrived almost as ingeniously as the plane itself.

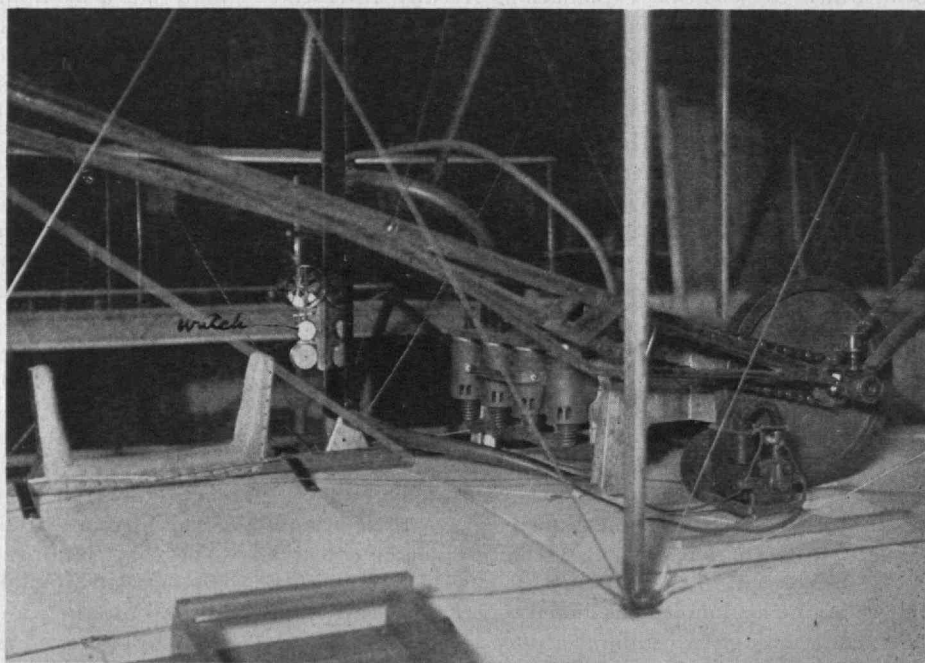
The Wrights had built their propellers from calculations based upon theory. Before their machine was completed they had measured the static thrust of their propellers and had found that 302 revolutions per minute were required to produce 100 pounds of thrust, instead of 305 revolutions as they had calculated. If their calculations were good under conditions when the plane was standing still, they thought their calculations would hold good under conditions of flight also, allowance being made for the difference in conditions. But they wished to check their theory with actual performance in flight. To do



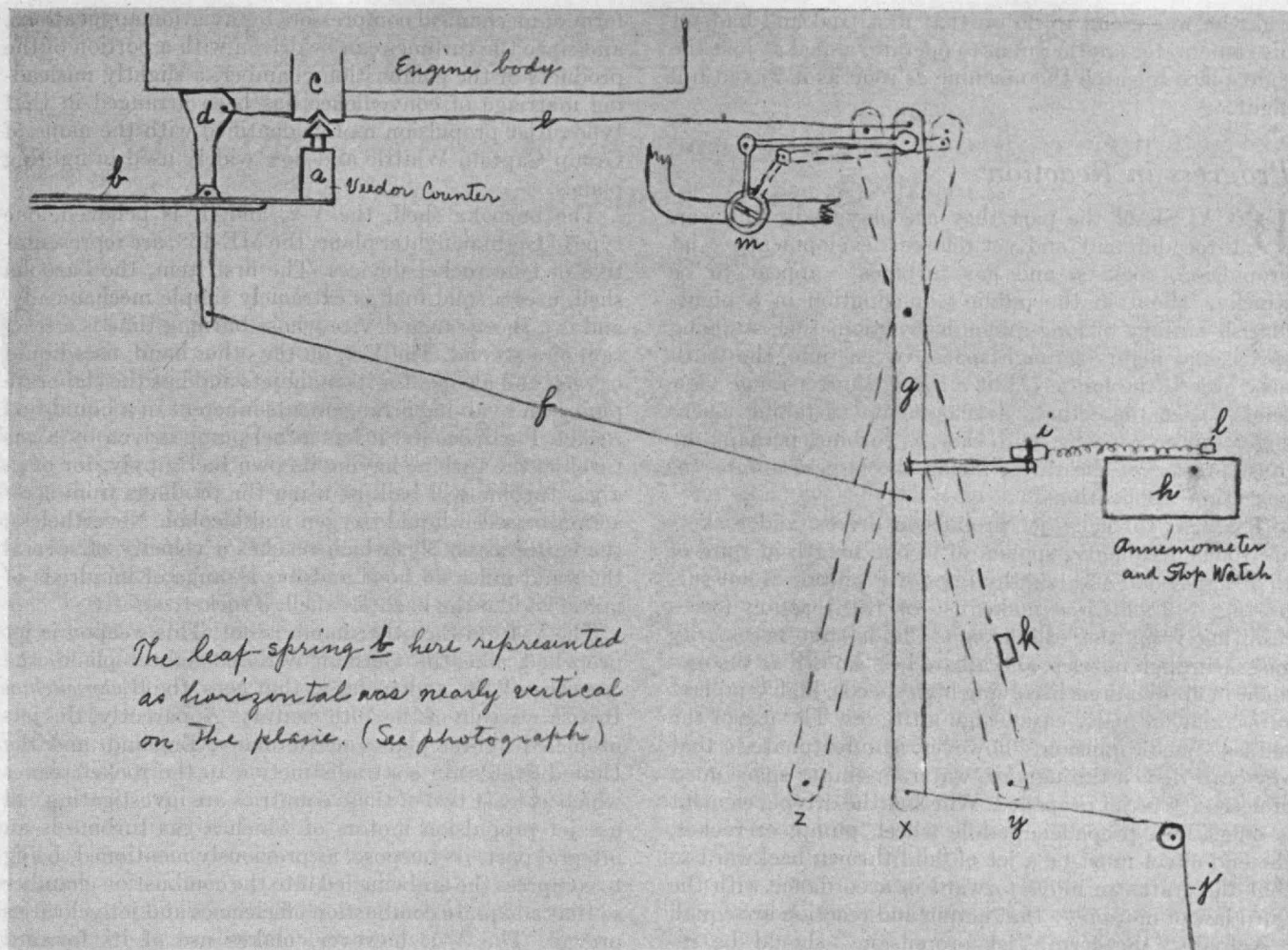
This photograph of instruments installed by the Wright brothers on their Kitty Hawk plane has been annotated to correspond with the sketch on the facing page.

so it would be necessary to determine the distance the propellers advanced through the air in flight, the number of revolutions, and the space of time. An anemometer, a revolution counter, and a stop watch, all of which started and stopped simultaneously, were installed on the machine to get this information.

The Veeder revolution counter (*a* in diagram) was mounted at the end of a flat leaf spring (*b* in diagram) and the end of the shaft of this counter was of rubber, shaped as a spearhead. The spring *b* held this rubber end of the shaft in engagement with the end of the engine crankshaft *c*. The lever *d* was pivoted at its center on the revolution counter support *b*, with one end pressed



The stop watch and anemometer as the Wright brothers arranged them to record the data of the epochal flight on December 17, 1903



The plan of recording devices on the first airplane ever to fly, as shown in an offhand sketch from memory by Orville Wright last month

against the side of the engine body. The end of this lever *d* was cam-shaped so that when the lever was in the position shown in the diagram, the revolution counter was held out of contact with the crankshaft; but when the lever *d* was moved anticlockwise it allowed the rubber end of the Veeder counter to come in contact with the engine axle and begin counting. The lever *d* was connected by two strings, *e* and *f*, to a lever *g*, as shown in the diagram. When the lever *g* was turned on its pivot clockwise the counter was held out of contact with the engine shaft. When it was moved anticlockwise the counter came into contact and recorded the engine revolutions.

The Richard hand anemometer *h* was a combination anemometer and stop watch as may be seen in the accompanying photograph. A small lever *l* on the anemometer was so arranged that when it was pressed in one direction both stop watch and anemometer started to record, and when the pressure was removed both stopped simultaneously. The exact time the anemometer was recording was timed by the stop watch.

A lever *i*, standing vertically, was connected at one of its ends to the lever *g* and at the other to the lever *l*, so that when the lever *g* was moved anticlockwise to start the Veeder revolution counter recording, it also, at the same time, through the levers *i* and *l*, started the anemometer and watch.

Before starting the engine the operator put the lever *g* into the position *x*, shown in the diagram, so that gas was fed to the motor through the valve *m*. In this position

none of the instruments would record. When the plane started down the monorail track, the string *j*, one end of which was attached to the starting rail and the other end to the lever *g*, jerked the lever *g* to the position *y* against the stop *k*, automatically putting all instruments into operation. The cord *j* was an ordinary piece of cotton string and broke easily when the lever *g* came in contact with the stop. At the end of the flight the operator struck the lever *g* with his hand, turning it clockwise to the position *z*, and so shut off all the instruments and closed the valve *m* in the gas line. (The motor had no carburetor. Gas was fed to the intake manifold by gravity, and after the motor stopped it continued to flow as long as the valve was open.)

The one little disappointment in the whole scheme was that the jar of rough landings set the stop watch back to zero. That happened in all four flights on December 17. However, the time in the air of each flight was independently timed by another stop watch held by the brother who stayed at the starting point.

It may be added that the obtaining of a good picture of the first flight was not accidental. The single-rail starting track was 60 feet long, but the brothers knew that with a wind of more than 21 miles an hour they would not need to run to the end of the rail before taking off. For each flight the plane left the rail at the moment the pilot turned the wings to a flying angle, and on the first trial that moment came after the plane had gone only two-thirds the length of the rail. Orville Wright estimated accurately

what he was going to do on that first trial and had set his camera, for another man to operate, aimed at just the right place to catch the machine as soon as it was in full flight.

Progress in Reaction

BECAUSE of the part they are playing in this war, three different and yet related developments — jet propulsion, rockets, and gas turbines — appear to be whirling about in the public's imagination in a nightmarish fantasy of long-range destruction, time-stopping speed, and flights through space. Given time, the truth may exceed the fantasy, but a sober, shorter-range view tends to see these three developments as taking essentially separate paths, with the gas turbine, perhaps the most prosaic of the three, facing the largest number of peacetime applications.

That gas turbines, jet propulsion drives, and rockets are today frequently spoken of in one breath in spite of their individual and lengthy lines of evolution is not surprising, for all three make use of the reaction forces resulting from the expulsion of fluids, not necessarily gases, through nozzles, and all are best known at the moment in applications involving high speeds, high temperatures, and, in many cases, high altitudes. The use of the phrase "jet propulsion," however, is unfortunate in that any craft driven through air, water, or empty space must of necessity be jet propelled. Whether the driving element is officially a propeller, paddle wheel, pump, or rocket, the end effect must be a jet of fluid thrown backward so that the craft can move forward in accordance with the third law of motion — that action and reaction are equal.

Actually, the term "jet propulsion" should be restricted to systems in which most of the fluid (commonly water, products of combustion, or air) issuing from the nozzle is picked up as the craft moves along. By contrast, a rocket is self contained, carrying with it all the ingredients that are later expelled from the nozzle. From the practical point of view, other differences also exist, rockets being substantially short-duration, high-speed affairs using both solid and liquid fuels but invariably carrying their oxygen (which may weigh three times what the fuel does) in the most compact form possible. Jet propulsion devices generally have lower exit velocities than rockets and can therefore achieve adequate propulsive efficiencies at lower speeds. Picking up the weightiest ingredient in the combustion process (oxygen) as they go along, and having also available an excellent diluent (the inert nitrogen of the air), they can operate for longer periods and at lower temperatures than can the rocket.

As for the gas turbine, it extracts energy from jets of combustion gases by the aid of buckets rotating about a shaft, the high speed so obtained enabling good efficiencies to be reached even though the turbine as a whole may be stationary. In this procedure it duplicates exactly steam turbine procedure. Unlike the steam turbine, however, the gas turbine is invariably accompanied by a compressor which absorbs up to 80 per cent of the power output of the turbine and which is required to push the air and fuel into the combustion chamber. Jet propulsion drives must also compress the air entering the combustion chamber, although this may be done by properly shaped ducts. Since the gas turbine is an excellent drive for rotary compressors which, all told, are about the most practical

form of mechanical compressors for aviation applications, and since the turbines can be driven with a portion of the products of the combustion chamber, a slightly misleading marriage of convenience has been arranged in that type of jet propulsion motor identified with the name of Group Captain Whittle and now widely used in fighting planes.

The bazooka shell, the V-2, and, it is believed, one type of German fighter plane, the ME-163, are representative of true rocket devices. The first item, the bazooka shell, uses a solid fuel, is extremely simple mechanically, and is a short-range device whose burning time is a fraction of a second. The V-2, on the other hand, uses liquid oxygen and alcohol for its main jets and has the elaborate piping and valving arrangements inherent in a liquid-fuel rocket. Furthermore, it has a fuel pump driven by a gas turbine, the turbine having its own fuel supply, for even a gas turbine will balk at using the products from a reaction between liquid oxygen and alcohol. Nevertheless, the entire assembly, which reaches a velocity of several thousand miles an hour and has a range of hundreds of miles, is, like the bazooka shell, a rocket.

The V-1, on the other hand, is not. This weapon is jet propelled, like the German ME-262 fighter plane, the American P-80, and, as far as that goes, the *Waterwitch*, a British warship of the 19th century. Apparently, the jet-propelled fighter planes of Germany, England, and the United States (in contradistinction to the rocket planes which at least two of these countries are investigating) all use jet propulsion motors of which a gas turbine is an integral part, its purpose, as previously mentioned, being to compress the air being fed into the combustion chamber so that adequate combustion efficiencies and jet velocities prevail. The V-1, however, makes use of its forward velocity to ram air under pressure into the combustion chamber. Automatic valves shut off the chamber while combustion takes place and the gases are expelled, and the cycle is then quickly repeated (about 40 times a second). This explains why the V-1 must get up to a high speed before it can fly under its own power, for at lower speeds the ram effect is not sufficient to raise an adequate pressure in the combustion tube. As for the 1,160-ton *Waterwitch*, it was built by the British Admiralty in 1866 to discover whether the Ruthven system of jet propulsion, patented 17 years earlier, was as efficient as propeller drives. Water scooped up by the forward motion of the boat was fed to a pump driven by a steam engine. Thus accelerated, the water was then expelled rearward at a higher speed than it entered. Two sister ships, also of 1,160 tons, were equipped with twin propellers. The tests showed that the *Waterwitch* needed 760 horsepower to reach 9.3 knots, while the propeller-driven ships obtained 9.6 knots with 696 horsepower.

While rocket and jet propulsion drives are substantially limited to the field of high-speed vehicles and projectiles, the gas turbine can do virtually everything that a steam turbine can, and with far less paraphernalia. More than 100,000 turbosuperchargers for airplane engines have been built in this country in the past 25 years. Switzerland has one gas turbine locomotive operating and another building, and Brown, Boveri and Company is reported to have already built some 25 gas turbines to drive blowers for blast furnaces and oil refineries. Another application which many expect, and which may become more important than the present jet (*Concluded on page 504*)

Alaska and the Engineer

Great Opportunities and Responsibilities Are Foreseen in Northern Regions After the War

BY RICHARD FINNIE

UNDER the general heading "Alaska" most Americans invariably group the bulk of the North American Arctic and Subarctic regions. Erroneous though it be, the conception is not unreasonable, for Alaska's economic and geographic situation is closely related to that of her neighbors to the east, who share many of her problems. Nowadays, more than ever before, one cannot consider Alaska in broad terms without also considering Canada's Yukon and Northwest Territories.

Prior to World War II, Alaska, the Yukon, and Northwest Territories, together embracing some 2,000,000 square miles, were insular both physically and spiritually. From the United States or southern Canada they could be reached only by water or air, and some portions were completely cut off for weeks or months on end. These factors militated against development and settlement, for comparatively few people cared to go to the trouble and considerable expense of pushing beyond the natural barriers into the High North.

Today the isolation is gone. One can travel anywhere by plane. And from any point in the United States one can drive an automobile right to the center of Alaska; one can communicate by radio with almost any town or village in the Arctic; one can actually telephone to Fairbanks, Whitehorse, or Norman Wells.

Until World War II, the background of Alaska was fairly well known to this extent: How it was dubbed "Seward's folly" or "Seward's icebox" after its purchase from Russia in 1867 for \$7,200,000 until its annual salmon and gold returns topped that figure; how it was the scene of the fabulous Klondike gold rush of 1897-1898 (actually in the Yukon Territory); and how it became a goal for summer tourists who sailed northward from Seattle or Vancouver and thrilled to the beauties of the inside passage.¹ Popular knowledge of the Northwest Territories was even more sketchy. Although many books of travel and exploration touching on one section or another of that million-square-mile hinterland had been published, not until 1942 was there a volume available reviewing its geography, history.

¹ An excellent reference work is Merle Colby's *A Guide to Alaska* (Macmillan). A more recent popular treatment is Evelyn Stefansson's *Here Is Alaska* (Scribner); and she presents profiles of Alaskan and Canadian far northern communities in *Within the Circle* (Scribner).

and resources as a whole.² Exploration of the Northwest Territories began with Martin Frobisher's fruitless search for a northwest passage to the Orient in 1576 (it was traversed for the first time by Amundsen in 1906, taking three years; it was traversed for the first time in one season, in 1944, by a patrol vessel of the Royal Canadian Mounted Police); exploration continued with the Hudson's Bay Company's search for fur, and Catholic and Anglican missionaries' search for souls.

Not until 1920 did the Northwest Territories produce any commercial commodities but fur and some whalebone, and in that year an oil well was brought in by Imperial Oil, Limited, at a spot on the right bank of the Mackenzie River, 75 miles south of the Arctic Circle and 52 miles downstream from an old trading post called Fort Norman. But that was 1,200 miles from Edmonton, the nearest city, and the local market for oil in those days was negligible. In 1925 the several wells that had been drilled since the discovery were capped and the camp was deserted.

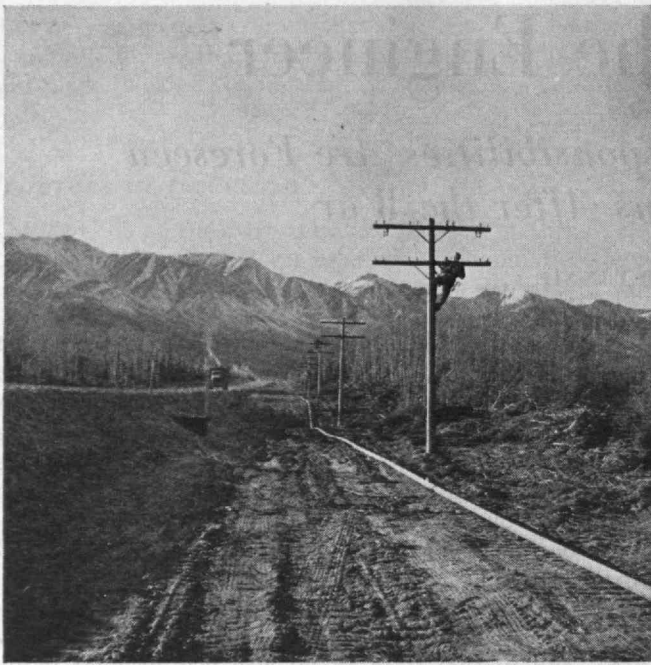
The growth of commercial aviation in the United States and Canada put airplanes into the Northwest Territories, the Yukon, and Alaska, and bush flying went hand in hand with mineral exploration. The early bush planes were mostly Fokkers, Fairchild, and Bellanca,

² *My Canada Moves North* (Macmillan).



Richard Finnie

Among the Mackenzie Mountains a lead dozer works on a side-hill cut while road locators, who have been scouting ahead with pack dogs, confer with a construction crew foreman. (Note completed cut around the hillside in background.) The Alaska Highway and the Canol Project demonstrated that modern construction equipment may be used as successfully in the Far North as elsewhere, with experienced operators.



Richard Finn

The Alaska Highway: Road, gasoline pipe line, and telephone lines are shown together in this scene southeast of Fairbanks. When the picture was taken, in October, 1943, the 1,500-mile Alaska Highway had been completed as an all-weather artery.

and they were mounted on skis in winter and pontoons in summer, the lakes and rivers being their landing fields. Prospectors, trappers, traders, and missionaries were quick to make use of them, and to many northerners flying became commonplace while it was still regarded as a hazardous enterprise by outsiders.

While two Junkers monoplanes ventured into the Northwest Territories as early as 1921 to carry petroleum men to the scene of the Fort Norman discovery, and while Rear Admiral Richard Byrd flew over Ellesmere Island in 1925, no considerable flying was done in the country until 1928 and 1929.

In Alaska, however, flying began in 1920, when the late General William Mitchell sent four Army DeHavillands from Mineola to Nome. Four years later the Post Office Department sponsored a series of test flights by the late Carl Ben Eielson between Fairbanks and McGrath, a distance of 272 miles. By 1938 there were more than a hundred landing fields in Alaska, in the Yukon there were several, but in the Northwest Territories there were none — because, although flying there had assumed great proportions, it was still being carried on exclusively with ski- and float-planes.

In the Arctic and Subarctic, bush flying was an immediate and tremendous boon to mineral exploration, for it enabled prospectors and geologists to cover vast areas in a short summer season; and aerial photographssimplified their investigations. Parties of prospectors searched for, and found, sizable deposits of copper; but in 1930, silver and pitchblende were struck on the southeastern shore of 12,000-square-mile Great Bear Lake, just south of the Arctic Circle. The following year a mine was opened there — the richest radium mine in the world, destined to break the Belgian Congo monopoly — and the oil wells on the Mackenzie River 300 miles away were soon uncapped to fuel its machinery and the boats supplying it. In 1938, the Northwest Territories' first gold brick was poured at Yellowknife, a town with a population of a thousand,

which had sprung up on the north arm of Great Slave Lake, 300 miles to the south of the radium mine. This augmented the market for the products of Norman Wells, where an 840-barrel-per-day straight-run refinery was installed in 1939, replacing a primitive but ingenious steam still. Aviation fuel as well as low-test gasoline and Diesel oil was now produced there. But the market was still small enough to be satisfied with an annual output of 24,000 barrels.

Meanwhile an enterprising and imaginative bush flier named Grant McConachie had promoted an aerial express and passenger service between Edmonton in Alberta and Whitehorse in the Yukon, just under a thousand miles via Grande Prairie, Fort St. John, Fort Nelson, and Watson Lake. Starting with ski- and float-equipped planes, he had soon scratched out some landing fields and switched to wheel planes, which could carry bigger pay loads. He negotiated a government mail contract and the Canadian Department of Transport undertook the construction of full-fledged airports to make the Edmonton-Whitehorse route permanent.

These two seemingly unrelated developments — the revitalized Norman Wells oil field and the inland air route to Whitehorse — set the stage for the Alaska Highway and its fueling system.

After Pearl Harbor the United States and Canada became sickeningly aware of the Japanese threat in the Pacific, which included Alaskan waters. There would have to be an overland defense route to Alaska. The one the War Department chose was determined by the chain of airfields already in use between Edmonton and Whitehorse, and others between Whitehorse and Fairbanks, in the heart of Alaska. The Alaska Highway would tie in all of these fields, some of which were already connected by roads or trails.

Shortly after the Alaska Highway had been started, a plan was formulated to tap a local source of oil to help fuel it and its airfields as insurance against the cutting off of the sea lanes between California and Alaska, and to save tankers that were urgently needed elsewhere. And the nearest available oil field was Norman Wells, about 500 air miles northeast of Whitehorse, the strategic potentialities of which had been repeatedly referred to the War Department by Vilhjalmur Stefansson, the Arctic explorer and scholar.

The United States Engineer troops pioneered the Alaska Highway, beginning in March, 1942, followed by scores of civilian construction companies who turned it into an all-weather road by October, 1943. In May, 1942, under the direction of the Corps of Engineers, and with Engineer troops, Bechtel-Price-Callahan, a combination of large American construction companies, began the Canol Project, which was to fuel the Alaska Highway and its airfields.

The Alaska Highway has been hailed as a wonderful engineering and construction achievement, and properly so, for it is one of the wonders of the modern world. Yet its construction was no more difficult and certainly less complex than the Canol Project. Whereas the former entailed the building of a 1,500-mile road and 80-odd major bridges, the latter entailed: (1) the expanding of a Subarctic oil field to step up its production from 24,000 barrels a year to a million barrels or more; (2) the laying of a 600-mile pipe line across sketchily charted, little known mountainous terrain from (Continued on page 504)

Research in Spite of War

How the French Technical Institute of Building and Public Works Operated During the German Occupation

By ROBERT G. L'HERMITE

THE Technical Institute of Building and Public Works is a corporation founded in France in 1933 by its present secretary, M. P. Caloni, thanks to the support of various associations of French contractors. It is under the control of the government, which helps support it by subsidies from several government departments. Its aims are to foster improvements at the upper and middle levels of the profession by means of classes and lectures; to assemble information about scientific work performed throughout the world in the field of the profession; and to encourage research.

A Laboratory of Building and Public Works, founded in 1935, is in constant touch with the Technical Institute, being commissioned to conduct research for the Institute organization and to make the tests and do the practical work growing out of its program. Publication of the work of the Laboratory is done by the Institute in the form of monthly and annual reports. The Laboratory, which like the Institute, is under the control of and subsidized by the government, carries on independent activity in addition to its work with the Institute. It conducts researches requested by government ministries and also does work for private interests for reimbursement.

The Laboratory and the Technical Institute continued to function during the period of German occupation. They succeeded in avoiding all contact with the occupying authority and carried on research on materials and methods of construction, publishing the results of their studies without submitting to any control by the Germans—a far cry from the restrictions imposed upon the French technical reviews. This result came to pass because of the hybrid position of the two organizations, which are neither purely public nor entirely private; such a situation had not been reckoned with in the invader's regulations. It was also due to our determination that we would not be forced into the German war organization. The activities that were thus carried on in spite of the occupation included teaching, documentation and publication, and research.

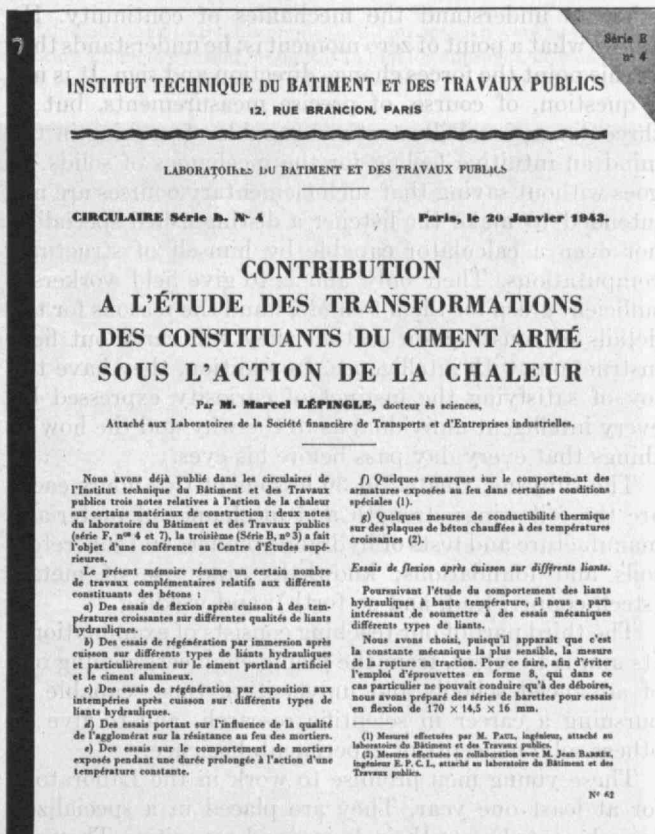
Teaching and Examination. The teaching includes lectures, courses, and examinations. The lectures are adapted to the higher levels of the profession: architects, engineers, and builders. Their aim is to provide information about the latest technical developments, about modern architectural ideas, and about the organization of work and accident prevention. They take place generally twice a week before an audience of 100 to 200 persons and are followed by discussions open to all those present.

Here are some of the topics of the 1944 lectures, which will serve to give an idea of the many subjects treated:

"The Architectural Profession Through the Ages," by M. Birr, architect
"Industrial Accidents and Their Psycho-physiological Causes," by Dr. Jean Perrin

"Theories of Pre-stressed Concrete Slabs," by Messrs. Freyssinet and Guyon
"The Welded Bridges of Neuilly and St. Cloud," by Messrs. Besnard and Campart
"The Different Types of Movable Dams," by Messrs. Parmentier, Bosbes, and Frote
"Beauvais of Tomorrow," by M. Noel, Grand Prix de Rome
"The Measurement of Deformations in Solids, New Extensometers," by Messrs. L'Hermite, Dawance, and Barree
"Scientific and Technical Documentation," by M. Wyart
"Utilization of Tidal Power," by M. Debes
"The Acoustic and Vibratory Isolation of Floors," by M. Brillouin
"Mixed Steel-Concrete Construction in Works of Art," by M. Ridet
"New Research in Soil Mechanics," by M. Florentin
"Plastic Materials in Valve Construction," by M. Regis

Thirty-eight lectures were given during 1944. The discussions and exchanges of opinions that followed opened horizons on new studies to undertake and were fertile in results. Classes occur in the evenings after closing time in the offices and on Saturday afternoons. The first series is for the advanced level and is intended for



French Technical Institute research publication reproduced from the M.I.T. library collection

the same public as the lectures. Their programs complement the teaching in more important schools and in the universities. They reflect the most modern and recent results of technical research. The subjects of study in this series are as follows: strength of materials, elasticity, and plasticity, by R. L'Hermite; testing materials, by R. L'Hermite; soil mechanics, by A. Mayer; manufacture and use of cements, by H. Lafuma; plaster, brick, tile, and various materials, by F. Astett; architectural acoustics, by J. Brillouin. They are supplemented by laboratory sessions where the students themselves perform operations and tests in micrography, tension, mixing and testing of concrete, bending of beams and reinforced concrete structures. The number of participants varies between 50 and 100 each year. One meets men of all ages, from the young engineer just out of school to the contractor near the end of his career.

The second series of classes is destined for a public of less advanced intellectual development. Before an audience of this type, it is above all necessary to avoid the use of abstractions and higher mathematics while awakening interest and curiosity. To this end a new formula has been employed which so far has been a confirmed success. Experiments are performed before the students and are interpreted in the most simple and elementary way. Theory proceeds from practice, which is in any case the natural order of things. In addition, the experiments leave in the minds of all a visual impression more persistent than that of a blackboard formula. A student who has himself loaded a continuous beam consisting of a flexible blade of steel, who has himself measured with counterweights and strings the reactions on the supports, who has measured with a curvimeter the deflection of this beam and felt its points of inflexion, is more able than any other to understand the mechanics of continuity. He knows what a point of zero moment is; he understands that at this point the forces change direction and sign. It is not a question, of course, of precise measurements, but of three-dimensional illustrations capable of evoking in the mind an intuitive feeling for the mechanics of solids. It goes without saying that such elementary courses are not intended to make the listener a distinguished specialist, nor even a calculator capable by himself of structural computations. Their only aim is to give field workers a sufficient grasp for them to understand the reasons for the details of construction so that they will carry out field instructions with intelligence. In addition, they have the joy of satisfying the instinct of curiosity expressed by every intelligent individual as to the why and the how of things that every day pass before his eyes.

The subjects, treated in 30 lessons of two hours each, are the following: strength and mechanics of materials; manufacture and tests of hydraulic binders and concretes; soils and foundations; knowledge and use of metals (steel, copper, lead, and so forth); and welding.

The third part of our teaching consists of examinations. Its aim is to select, from the young engineers coming out of advanced schools and universities, those capable of pursuing a career in scientific research, and to give to others solid concepts of experimental science.

These young men promise to work in the Laboratory for at least one year. They are placed in a specialized branch according to their desires and capacities. They are assigned to conduct a specified research in collaboration with an older engineer and under the control and guidance

of the head of the Laboratory. At the end of their work they write a report and explain the results of the work before a jury. The latter eventually confers on them the diploma for advanced studies.

After this first phase, the students may be authorized to remain in the Laboratory and to form part of the permanent staff. They pursue their research in the framework of the general program and, at the end of a few years, may present to a university a thesis for a doctorate in physical sciences or for a doctorate in engineering.

Documentation and Publication. The second task of the Technical Institute is documentation. In the first place it must gather a bibliography, constantly brought up to date, of technical publications in the field of building and public works. To this end it owns an important library and receives French and foreign periodicals. The articles in these periodicals are abstracted and microfilmed. The abstracts, collected in a monthly bulletin, are sent to contractors, architects, and engineers. On reading the abstracts, the latter may order microfilms of the articles that interest them.

Second, it has been found necessary to concentrate from time to time on a given subject so that the practitioner may have before him a general picture of the state of knowledge on this subject. This corresponds to the "Symposium" published periodically by the United States Bureau of Standards. All of the bibliography relative to such a subject is then collected, condensed, explained, supplemented by laboratory reports, and published in the form of a "Lecture Report." As examples we cite the following topics which have been treated in this fashion: elastic and plastic deformation of concrete, effect of low temperatures on materials and conduct of construction operations in freezing weather, physical properties and mechanics of cut stone, resistance of concrete and reinforced concrete to repeated stresses, deformation of lead, and resistance of metals to low temperatures.

Finally, the Technical Institute prints the lectures and the courses of its teaching program and the results of the laboratory work. The format of these publications follows a new formula dictated by circumstances, whose present success assures its continuance. Before the war, the Institute owned an organ entitled *Annales de l'Institut Technique*. At the time of the occupation, according to the rules imposed by the Germans, it became necessary to submit to censorship every periodical published and (by implication) to publish from time to time a eulogistic article on Germanic *Kultur*. In bibliographical references, every mention of an American or English scientific title was undesirable, if not forbidden . . . and so on. Under these conditions, we preferred to abstain and simply to suppress the *Annales*.

To get around the difficulty, we profited by a gap in the invader's rules. These did not forbid what was in effect the sending of letters and circulars to the members of an association. Since the Technical Institute was an association, having members paying dues, it was possible to send to our members printed periodical circulars. Articles, lectures, and reports were therefore printed separately, in separate folders. These folders were divided in 15 categories corresponding to 15 different specialties. Each category is identified by a different color reproduced on the first page and back of each folder. This procedure permits convenient (Continued on page 510)

On Art and the Photograph

Recognized as a Visual Force and a Creative Medium as Well, Photography Gains in Capacity

BY L. MOHOLY-NAGY

THOUGH all too generally given but slight regard in the creative sense, photography in barely a century of evolution has become one of the primary visual forces in our life. Formerly, the painter impressed his vision on his age. In our time, that which has been thus impressed is the vision of the lens as the emulsion records it. One has only to recall the romantic outlook of former generations upon the pictorial presentation of landscapes and other objects, and compare it with the way they are perceived now — “photographically.” This word stands for the incisive sharpness of camera portraits, pitted by pores and furrowed by lines; for the air view of a ship at sea moving through waves that seem frozen in light; for the chiseled delicacy of an ordinary sawed block of wood; for the close-up of a woven tissue; for the whole complex of rarely observed details of structure, texture, and surface treatment of whatever object.

During the century of its development, photography has been considered primarily as a mechanical means of recording which, *ipso facto*, could not produce art. The rare interpretations that tried to elevate photography to art have in the main been influenced by the esthetic-philosophic concepts that circumscribe painting. Hence photography with conscious “art” ambitions has remained in rather rigid dependence on the traditional forms of painting and has in addition passed through the successive stages of all the various art “isms.”

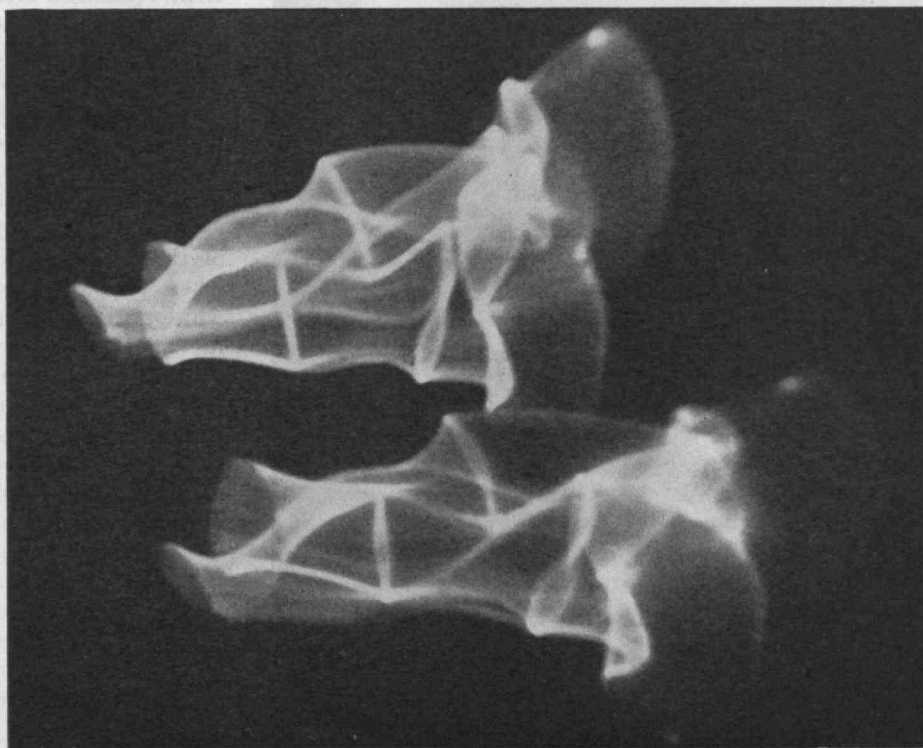
When fundamental discoveries are thus confined to the mentality of bygone periods, productive activity is arrested. So it has been in the photography of the past hundred years, as far as art is concerned. In the fields where it has been employed without art ambitions — in scientific work, police records, picture reportage — it has yielded notable results; it has been the pioneer of an original development, of one peculiar to itself, unconcerned whether it was called “art” or not. Knowledge of its science and technology, its optics and chemistry, attained unit by unit and then unpretentiously applied, sufficed to make photography, as we have said, one of the primary visual forces in our life.

A fundamental reason for this accomplishment is that through photography we can participate in new experiences of space. The stereotyped expression for this fact is

that thanks to the photographer we have acquired the power of perceiving our surroundings with new eyes. Photography can register the speed or stop the speed of objects in a hundredth, thousandth, or millionth of a second. It can “see” in the dark by using infrared emulsion. It can penetrate and record the inside of the opaque. The advances in photographic technique in recent years amount almost to a psychological transformation of our vision,* since the sharpness of the lens and its unerring accuracy have trained our powers of observation up to a standard of visual perception which embraces ultrarapid snapshots and the hundred-thousandfold magnifications employed in photomicrography. Matter-of-fact enumeration of the specific photographic potentialities emphasizes the power latent in the eight varieties of photographic vision:

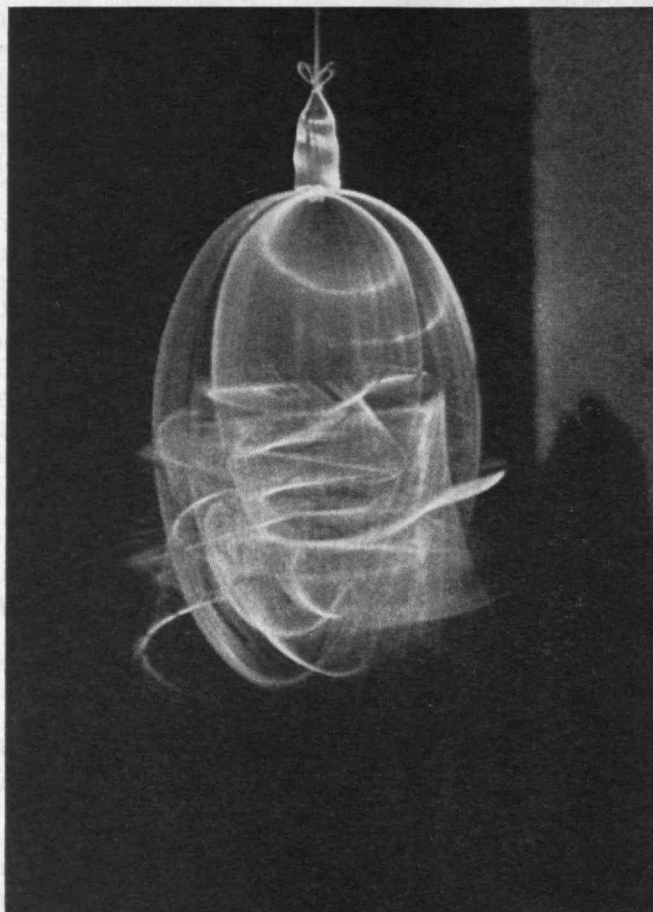
1. *Abstract seeing* by means of *direct* records of shapes produced by light.
2. *Exact seeing* by means of the normal recording of the appearance of things; reportage.
3. *Rapid seeing* by means of the fixation of movements in the shortest possible time; snapshots; stroboscopic photography.
4. *Slow seeing* by means of the fixation of movements spread

* Helmholtz used to tell his pupils that if an optician were to succeed in making a human eye and brought it to him for approval, he would be bound to say, “This is a clumsy piece of work.”



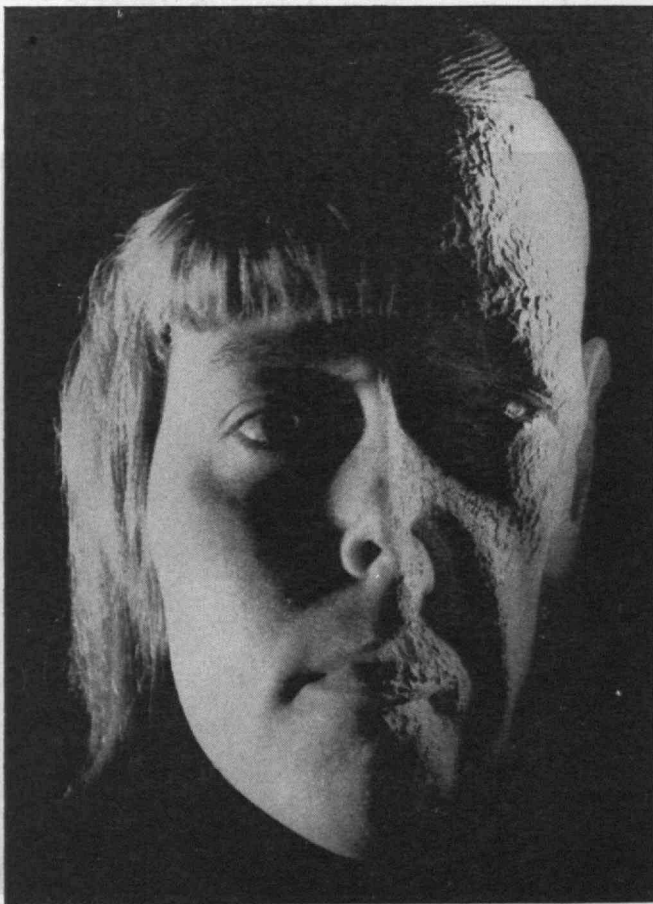
Reflections from Ferrotipe

Joseph A. Mills



Virtual Volume

Stanley Kazdalis



Double Exposure

Niko Geane

over a period of time, as in the luminous tracks made by the headlights of motor cars passing along a road at night; prolonged time exposures.

5. *Intensified seeing* by means of macro- and microphotography, and by means of filter photography which, by variation of the chemical composition of the sensitized surface, permits photographic potentialities to be augmented in various ways ranging from the revelation of far distant landscapes veiled in fog or haze to exposures in complete darkness; infrared photography.

6. *Penetrative seeing* by means of x-rays; radiography.

7. *Simultaneous seeing* by means of superimpositions; the future process of photomontage.

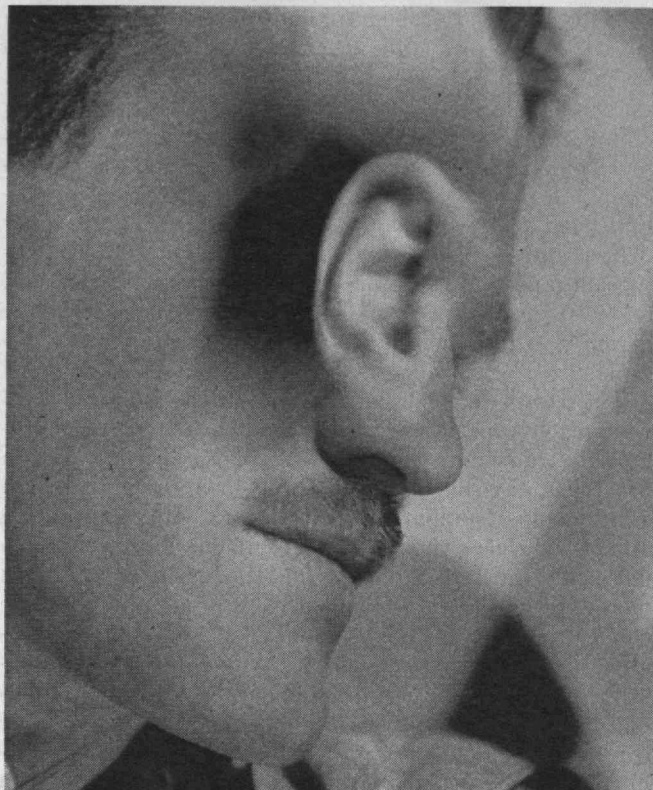
8. *Distorted seeing* — optical jokes that can be automatically produced by means of exposure through a lens fitted with prisms, or by means of reflecting mirrors; and by means of chemical and mechanical manipulation of the negative after exposure, as in reticulation, solarization, and so on.

All eight of these varieties of photographic vision can be and are powerfully utilized in modern practice of the reproductive illusionistic function of portrayal through photography. The first, the seventh, and the eighth, however, we shall discuss again in another connection. The development of the entire group, with the concurrent development of thoroughgoing knowledge of the physical and chemical techniques upon which effective use of them depends, has been the achievement of the past century. It finds culmination and justification in the surpassing ability with which the camera today reports and records both the overt and the esoteric aspects of our forbiddingly complex world.

All these powers of photography which taken together have enabled us to see our surroundings with new eyes are, however, isolated characteristics, not altogether dissimilar to those of naturalistic painting with its imitative rendering. But if in photography we learn to see, not the "picture," not the esthetics of painting, but an ideal instrument of visual expression based upon the properties of the light-sensitive emulsion, which can be a self-sufficient vehicle for creative work, then we may be nearer to "art" in this field too. For photography is far more than a great visual force; it is a new medium of expression.

Light and shadow in their interdependence were fully revealed for the first time through black-and-white photography, which fostered an increasing adoption of flowing light and richly graduated shadows, whence a greater animation of surfaces and more delicate optical intensification were possible. This multitude of gradations is one of the fundamental "materials" of photography. And when we pass beyond the immediate sphere of black-white-gray values and learn to think in terms of color, the fact holds equally true. If pure color is placed against pure color — flat, plain tone against tone — a hard, decorative, posterlike effect generally results.† A classical device to dispel such effects and create a more delicate and melting impression is to use colors in conjunction with their intermediate tones. Photography, through the black-white-gray reproduction of colored subject matters, has enabled us to recognize the most subtle differentiations in both the gray and chromatic scales, differentiations that represent a new and hitherto unobtainable quality in previous ways of visual expression. This, of course, is only one point among many, but it is the one where we must begin in order to master the genuine properties of photography,

† It should be said here that nonobjective painting has tried to overcome exactly this deficiency and that this effort is an important part of its "problem area."



Superimposition

George Morris, Jr.



Solarization

Yutchi Idaka

for it is the one at which we start to deal more with the artistic function of expression than with the representational function of portrayal.

Whether he seeks to report or to express, the photographer's task is to identify unmistakably for the spectator the true shape and nature of his object. He performs this task, basically, by using light and gradations of light to define that object, to "tell the story." Hence the properties of the light-sensitive emulsion are the first knowledge which he must master, and hence he is inevitably brought back to the primordial experiment which Fox Talbot made in 1835 by laying lace directly on photosensitive paper, which when exposed to light recorded the varied intensity thereof in black, white, and gray values. Talbot's result was the first crude photogram.†

Exploiting the unique characteristic of the photographic process — the ability to record with delicate fidelity a great range of tonal values — the photogram provides the path to basic discoveries with the interplay of light. It can be called the key to photography, because the good photograph must possess the same fine gradations

between the black and white poles as the photogram. It conjures up as many interpretations as it has viewers, and with new discoveries the original range of its elements can be enlarged. For example, printed transparent cellophane sheets, blank films, and glass plates covered with ink drawings can be used as negatives which in an enlarging apparatus combined with the usual technique of the photogram may give surprising results. Or squeezing such materials as oil, paint, or ink between two glass plates

to be used in producing photograms provides astonishing shapes for the recording of light values.§ Employed as negatives, the glass plates produce photographic records of the effects of mechanical pressure; as they substitute photographic evidence for guesswork in computing the performance of materials, they recall the experiments out of which present methods of three-dimensional photoelasticity were developed.

But, more important to our present purpose, these and other photogram negatives may one day be used as elements of purely artistic creative expression. As "light records" both in black and white and in color,



Mirroring

Institute of Design

† Around 1920, Man Ray and I, independently of each other, re-invented the photogram. This technique has since become a standard means of visual expression.

§ I had a good opportunity to use the oddity of oil drops squeezed between glass plates as a special effect in the motion picture, *Things to Come*, by H. G. Wells, directed by A. Korda (London Film, 1936).

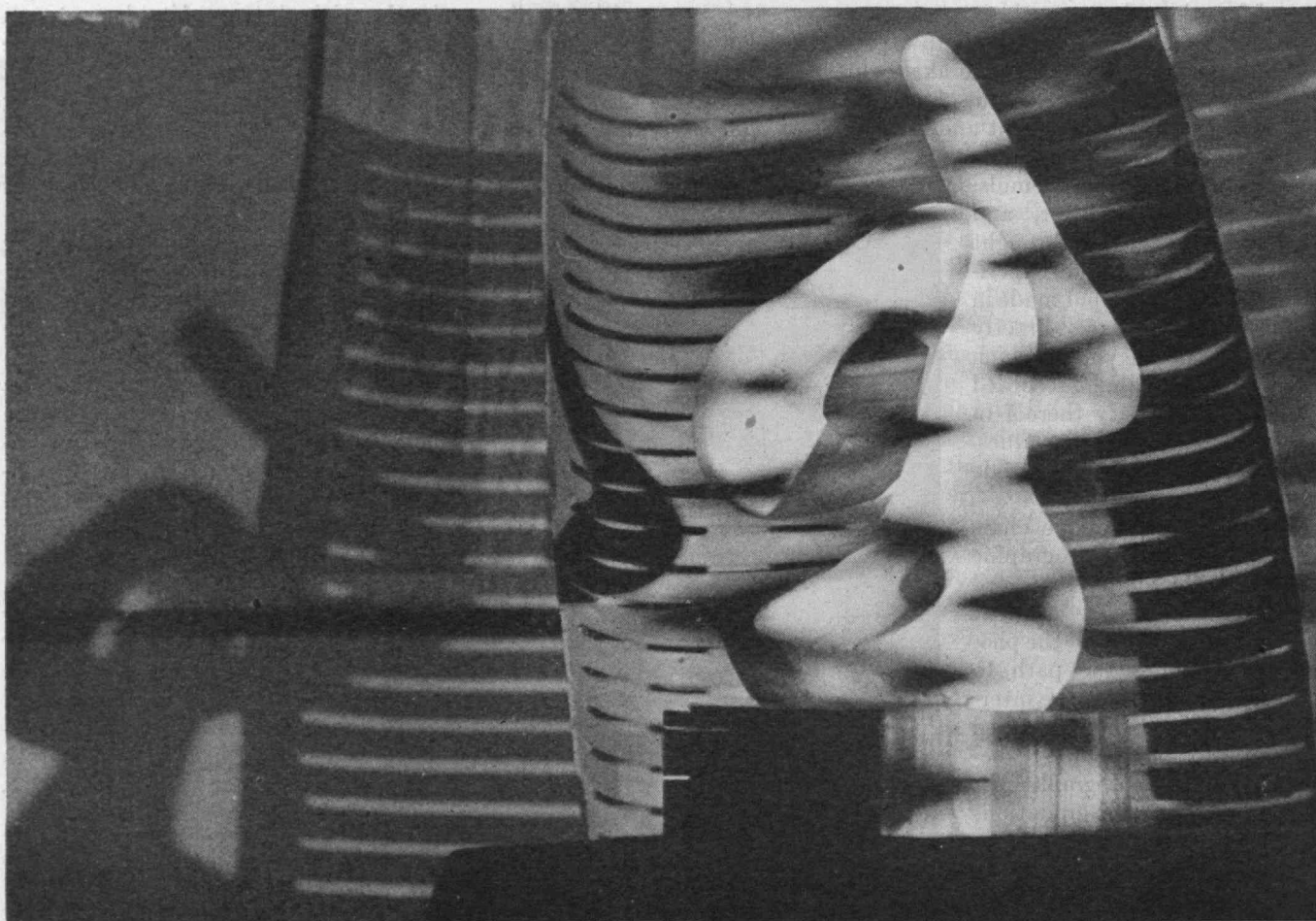
photograms lead to a new grasp of spatial relationships and spatial rendering. The receding and advancing values of the gradations, which are nothing but projections of the "light tracks," can be used for space articulation and contribute to the understanding of new art forms, especially architecture and the motion picture, both of which operate with light. The deeper understanding of light and space values which the photogram fosters is of direct virtue in photography with the camera, for good camera work means capturing the patterned interplay of light and shadow in the same way as with the photogram.

By this definition, the photographer's undertaking is to register on the sensitive emulsion the way in which light is intercepted, reflected, refracted, distorted, by his subject — that is, how his subject modulates light into a pattern of whites, grays, blacks. Any object, especially if it has concave-convex surfaces, may be considered a light modulator if it reflects the light and colors of the spectrum with varied intensity, depending upon its substance and the different ways in which its surfaces are turned toward the light source. With its complexity of substance, surface, contour, color, and texture, the human face is a marvelous light modulator. It contains few straight lines; flat surfaces, if any, are small. Compound curvatures abound. Surface, texture, and color vary with the person's age, from the skin of a baby to that of an old man, with the countless degrees of difference between. Then there are the eyes, which offer specific light-modulating problems of surface, texture, shape, in addition to their general quality of expressing personality. The beard or mustache

presents a special problem in light modulation, as do the hair, the eyebrows, and the eyelashes. Finally there are the lips and the teeth, and the rich studies in light and shadow of the ear.

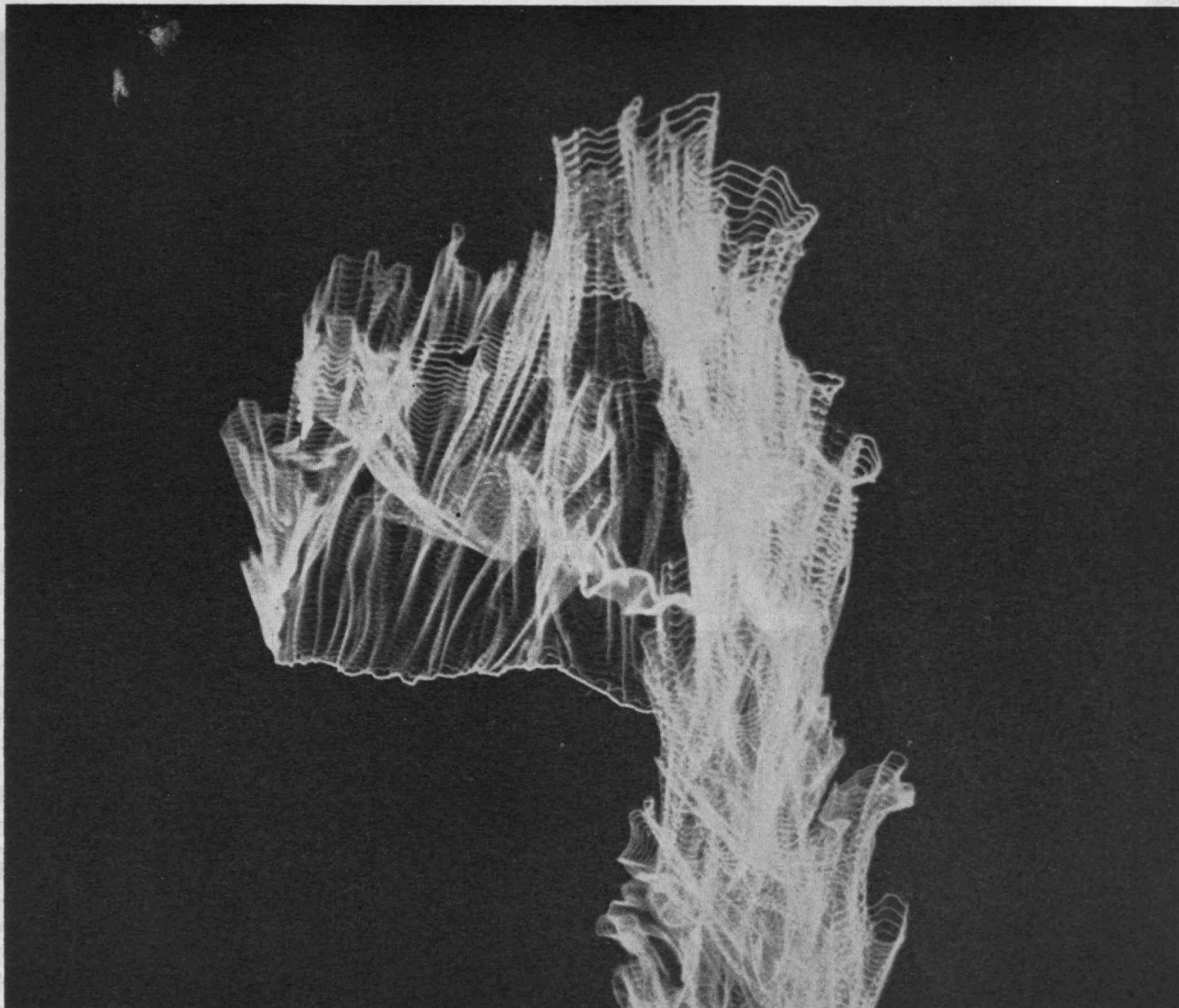
Regarding photography thus, one recognizes that no real barrier exists between the *abstract seeing* of the photogram and the *exact seeing* of the reportage photograph — that both are nothing more than records of the interplay of light and shadow. Hence experimentation with the photogram and with simple light modulators — cut and folded paper, molded plastics, bent and twisted metal — is rich in stimulation and skill for the practicing photographer.

The study of such modulators brings knowledge of what each type of modulation will mean in its photographic translation. The photographer will encounter in practice many shapes and types of surface; definite space relationships; comparative dimensions; interpenetrating objects; surfaces that meet and cut one another; transparencies; mirrorings. Applying the principles of light modulators to them as elements of a broad photographic concept, he controls the uses and effects of each individually and in relation to the others. And in creative photography are offered important applications of the light modulator. Its effects produce emotional reactions through the combinations of shape, contour, texture, color, and lighting. Thus one may paint with light as surely as one can paint with oil and pigment. Thus, too, the recognition of photography as a medium of artistic creation enhances its power as a visual force. (Continued on page 518)



Light Modulator

Mülle Goldscholl



Portrait of alternating current. This jagged veil of fire represents part of a flashover, or electric arc, from an alternating-current power source of 1,000,000 volts. The striations are caused as the current passes through zero 120 times a second in its alternations forward and then backward. Photograph by the author for *LIFE* magazine at the Westinghouse company's high-voltage laboratory at Trafford, Pa.

On Photography in Science

To Define and Disseminate Facts the Camera is Powerful

BY F. W. GORO

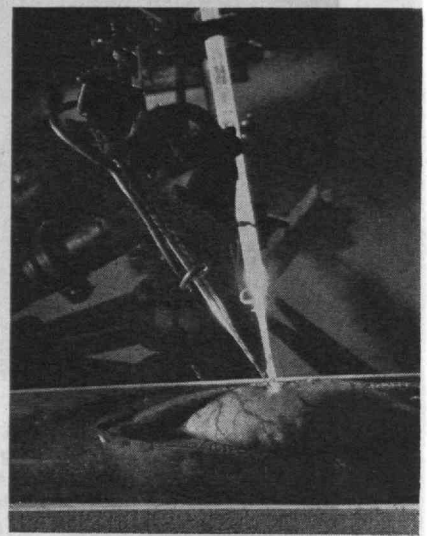
THE time has not yet arrived for anyone to try to be definitive about photography in science, for no one can yet even surmise how far the ramifications will extend. In many fields, without photography there is literally no science, if we understand science as being definite measurable information about objective reality. In many other fields, comparatively little use has been made of the multifold opportunities which photography offers for the sharp definition of facts and for the clear dissemination of them. But a good start has been made; more and more both the scientist in his own work and the scientific journalist in his responsibility of helping

the layman to comprehend that work are relying on the pictorial aid which lens and film and skill afford. Photography serves science in numerous ways. It can make the dynamic static — hold action for analysis. It can allow visual comparison of subjects otherwise unrelated. It permits the greatest intensification of vision, by going close, closer, closest, to the subject and thus sharpening man's eyes to unbelievable precision.

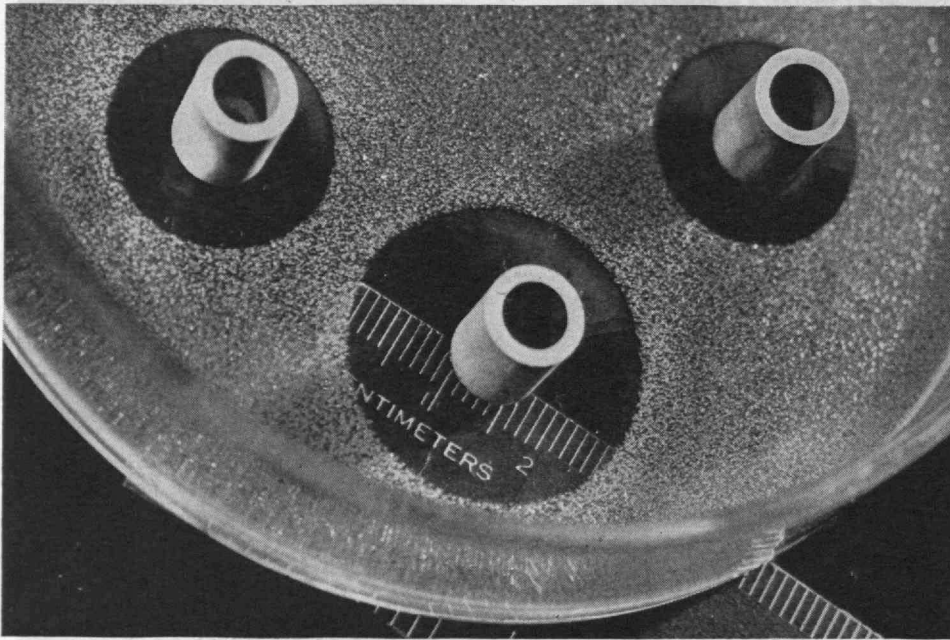
Some of these powers of photography in science are demonstrated in the photographs with this article, all of which were made for *LIFE* magazine as parts of photographic stories of scientific or technological developments.



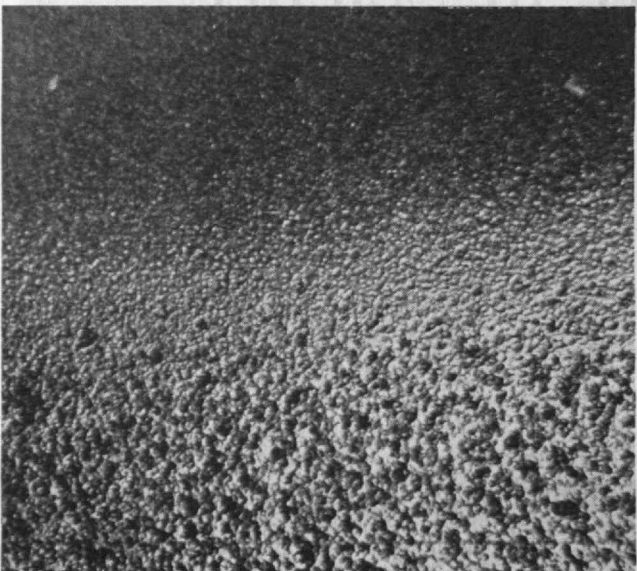
*Close-Closer-Closest: Three photographs of the Oxford test for potency of penicillin show the value of progressive close-ups. Top left, an ordinary picture, gives no specific information beyond showing the apparatus needed. The technician is measuring something; to find out the criteria by which the test is actually made, we have to go closer, and middle left shows the criteria to be the radii of the clear areas surrounding the small cylinders, caused by the inability of bacteria to grow in the presence of penicillin. The picture has been taken from a thoroughly human point of view — the lens of the camera has replaced the eye of the technician. Bottom left goes closest — a photomicrograph of the boundary area between inhibited and uninhibited growth of the *Staphylococcus aureus* — and it tells the technician less but the scientist more than does the former.*



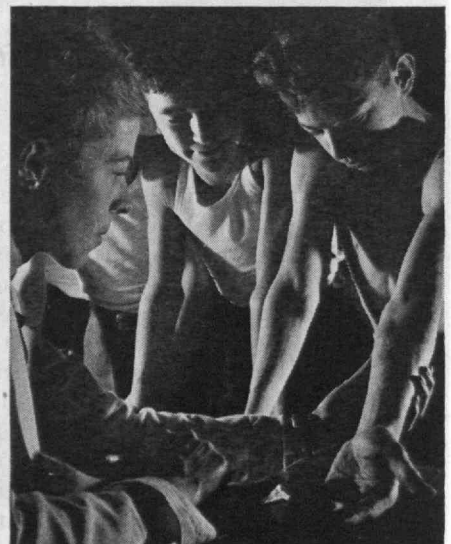
Kniseley's illuminator of living tissues. Light-conducting quartz rod is shown in working position on stomach wall of anesthetized amphioma . . .

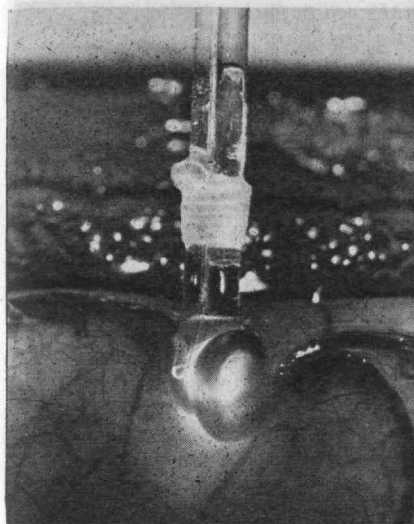


All of them strive to put the layman's eyes in place of the scientist's, to let uninstructed eyes see with as much knowledge as possible. Of course there must be reliance on words as well as pictures, on explanation as well as representation. By this necessary reliance on words the science photographer is debarred from purely esthetic considerations, from the "absolute" in art terms. But this exclusion by no means puts him in the role of the spot news photographer, who is little more than a function of the events he records. For if the science photographer is truly to aid uninstructed eyes to see instructedly, not only must he utilize words but he must also select shrewdly and



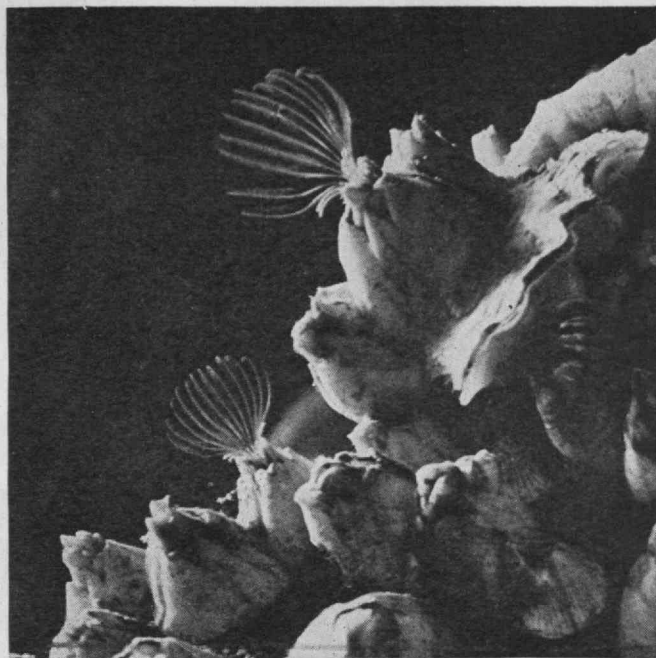
Right: The school nurse is photographed examining the arm of a high school boy. The lineup of the boys makes it clear that this is not an individual case, but rather, a medical mass investigation. Mass surveys are one of the most powerful weapons of preventive medicine against tuberculosis. Routine for such a mass survey calls for a tuberculin immunity test to isolate the "positives," who are then x-rayed to determine whether their reaction signifies an active or arrested condition. The survey technique has lately been simplified by the development of the Vollmer tuberculin patch test. It is applied by a strip of adhesive tape carrying two small squares of dry, tuberculin-saturated filter paper. (See the facing photograph on page 497.)





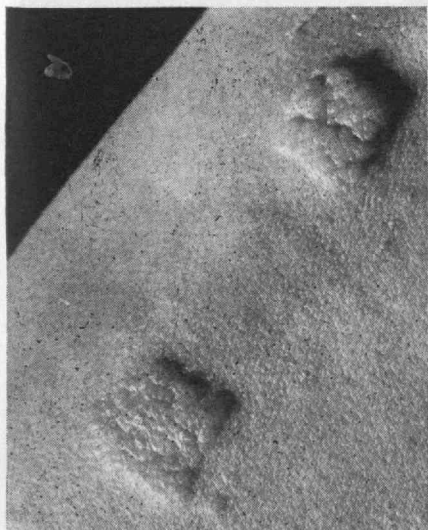
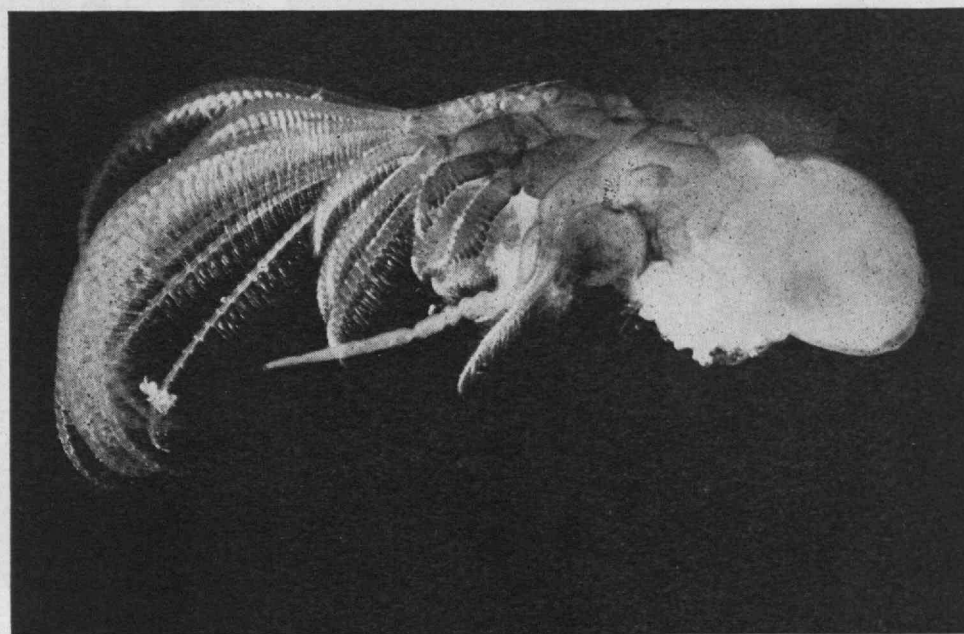
... but in macrograph only, one sees clearly how the delicate tip of the rod is carefully inserted under a large blood vessel on stomach wall.

Outside to Inside: Photography records evidence that the pernicious barnacle is akin to the arthropods rather than to the molluscs — a distinction which is important and was for a long period not known. Top right shows a colony of barnacles, some individuals being pictured in the rarely seen feeding position. Middle right presents one individual dissected from its shell. Clearly shown is the segmented structure of the head and thorax of the delicate body, indicative of its relationship. Realistic representation can bring objective fact to the student more swiftly than can overlong descriptive terms or necessarily oversimplified diagrams; here in direct presentation and in magnification the facilities of photography for imparting information have been employed to supplement the work of the biologist.

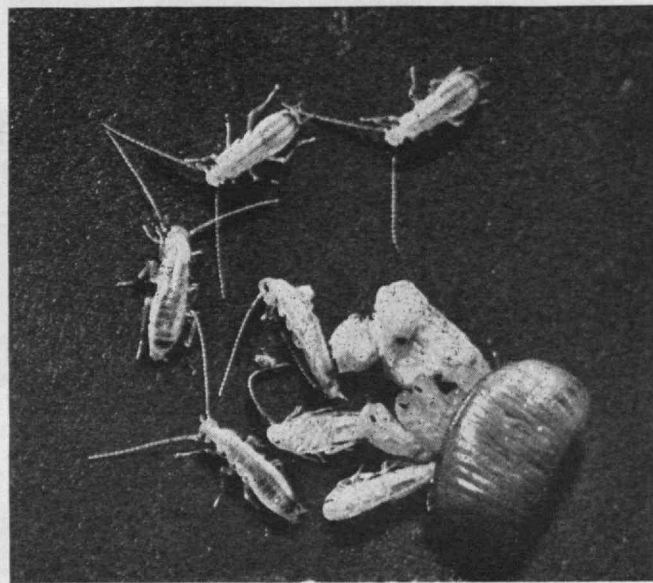


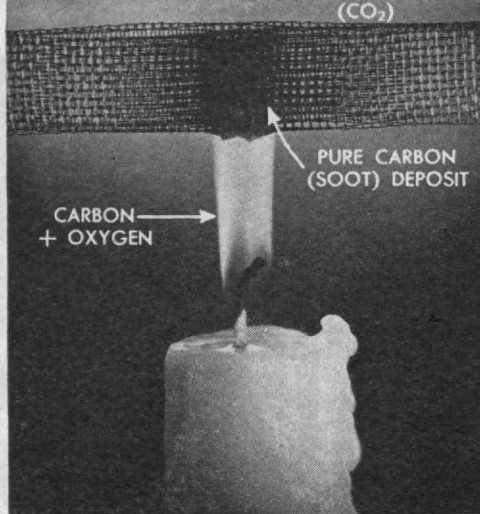
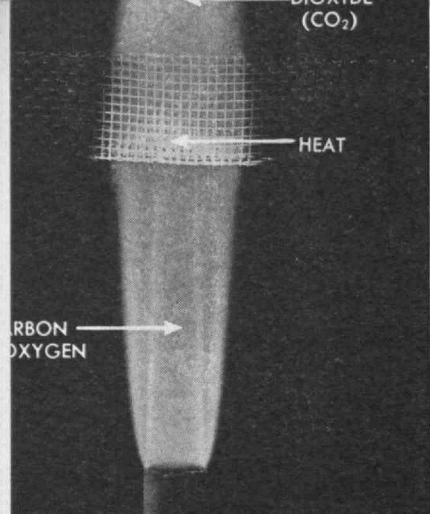
sympathetically from his complex subject matter the individual topics and aspects of topics which can best be combined to tell an abstruse story with utter honesty and utter clarity. His undertaking is thus in large part editorial, and he must in good measure make the event a function of himself.

To do so, he need not be an expert in the science which he is reporting. Though he must understand what he photographs, for otherwise he cannot make a good picture, he will rely more upon interested curiosity, upon a predisposition toward knowledge. To this he will add inventiveness, for if he is to inform others with clarity, it will not be enough for him merely to

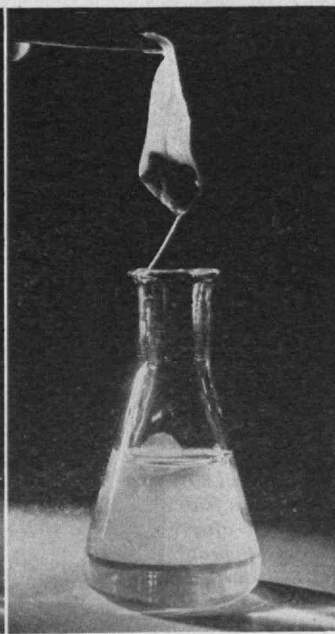
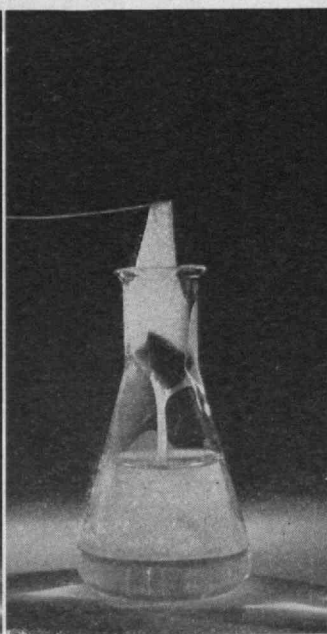
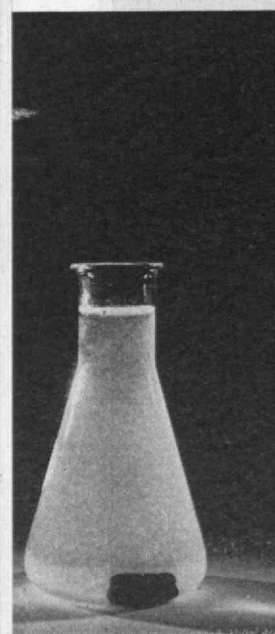
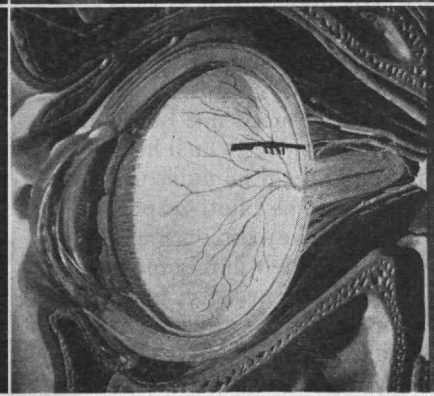
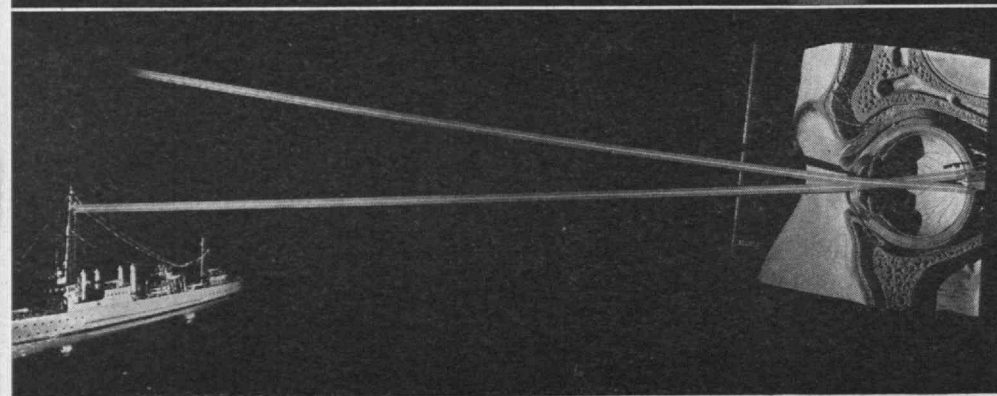
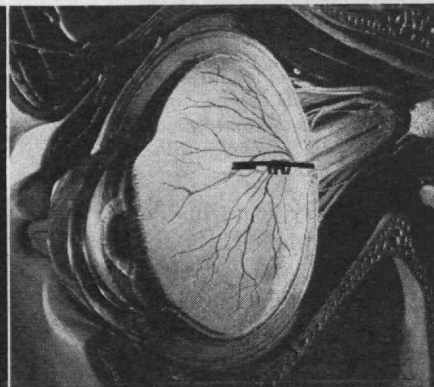
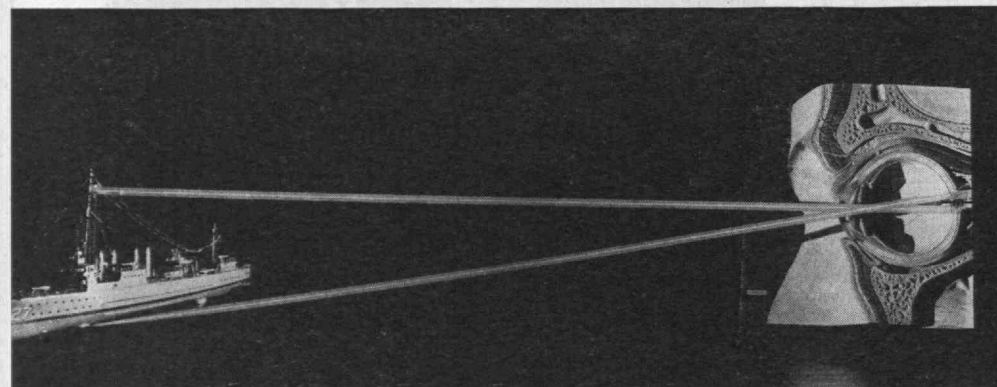


Left: In positive cases, the tuberculin in the Vollmer patch test produces two reddened square weals on the skin within 48 to 96 hours after application. Close-up of the weals in natural size shows with almost brutal sharpness what the diagnostician sees. Photographs of this type have proved to be of value for training of physicians and nurses in new investigation techniques. Right: The seldom photographed birth of a cockroach. The egg sac of a German roach finally splits on the edge from the pressure of 30 or 40 growing embryos. In a few minutes one little roach after another fights its way to the open. An hour later they will run for cover with true cockroach speed.





PHOTODIAGRAMS will in future replace many of the line drawings which make textbooks so tedious. They will do so not for esthetic reasons but because of the simple fact that they tell the story better. Left: Photographs of gas flame as an example of efficient, and of candle flame as one of inefficient oxidation illustrate this point. **MODELS** are often a great pictorial aid to explain and simplify photographically complicated problems such as those of day and night vision. In day vision (below), looking straight at object, the eye registers image on cone cells directly behind lens . . .



. . . In night vision (above), eye must look above or to one side of the object that is to be seen, because the cone cells at the center of the retina are blind at night. The image then registers on the rod cells. Left: Functional analogy demonstrates in three steps (from left to right) how the clotting power of a thrombin-fibrinogen solution can be used for the removal of a foreign body through the narrow neck of a flask. This technique has been used to remove kidney stones surgically, an operation which could not be photographed in situ.

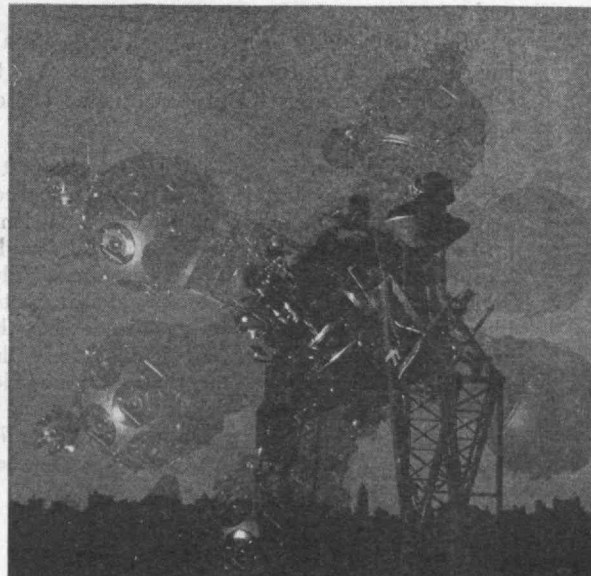
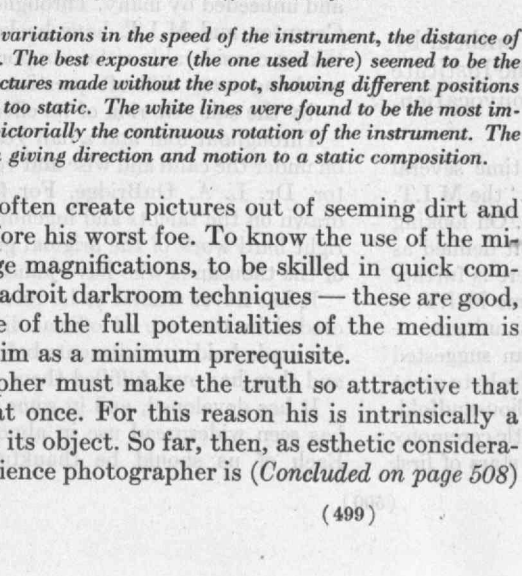
Motion through Multiple Exposure: This giant projector moves slowly around the polar axis to project celestial constellations on the dome of the Hayden Planetarium. Two solutions are possible for photographing the instrument. Its strange appearance automatically suggests easy dramatization. Or one can try to tell honestly at least something about its functioning. Its ability to rotate and to compress into a few minutes the changes in the sky with changes in latitude must be conveyed by any photograph seeking this second solution. At the lower right, different positions of the instrument are recorded by multiple exposure, a single open flash shooting against the white dome giving a multi-directional light source and preventing the formation of shadows. But the idea of motion is not imparted. To give this idea visual expression, as in the large photograph, a small spotlight was used to "draw" the white lines of the highlights during the time the instrument moved from one position to the next. Making a photograph of this sort demands preparation. The service crew of the instrument had to be present and to collaborate with enthusiasm. Calculations had to be made, sketches drawn. The complicated switchboard of the instrument made it easy to plan the time intervals between motion and stop. Working in total darkness made it possible to expose at one time the three cameras which were used in different positions to give variety in composition. A shooting script is helpful with such problems. This is part of the script used: "1. Room totally dark; 2. Open shutters of three cameras; 3. Attention. Shield flashlights; 4. Instrument in position for first exposure; 5. Flash. (Exposure 1); 6. Small spotlight on. Move instrument to second position. As motion stops, switch out spotlight; 7. Flash. (Exposure 2)," and so on. The whole procedure was varied and repeated several times, with three

to eight exposures on one negative, variations in the speed of the instrument, the distance of the flashes, and the use of the spot. The best exposure (the one used here) seemed to be the one showing three positions. The pictures made without the spot, showing different positions but no reflection (lower right) were too static. The white lines were found to be the most important element in demonstrating pictorially the continuous rotation of the instrument. The traces act as a visual catalyst in giving direction and motion to a static composition.

represent. Rather, he must often create pictures out of seeming dirt and dust. Specialization is therefore his worst foe. To know the use of the microscope, to understand large magnifications, to be skilled in quick computation of exposures and in adroit darkroom techniques — these are good, but not enough. Knowledge of the full potentialities of the medium is properly to be expected of him as a minimum prerequisite.

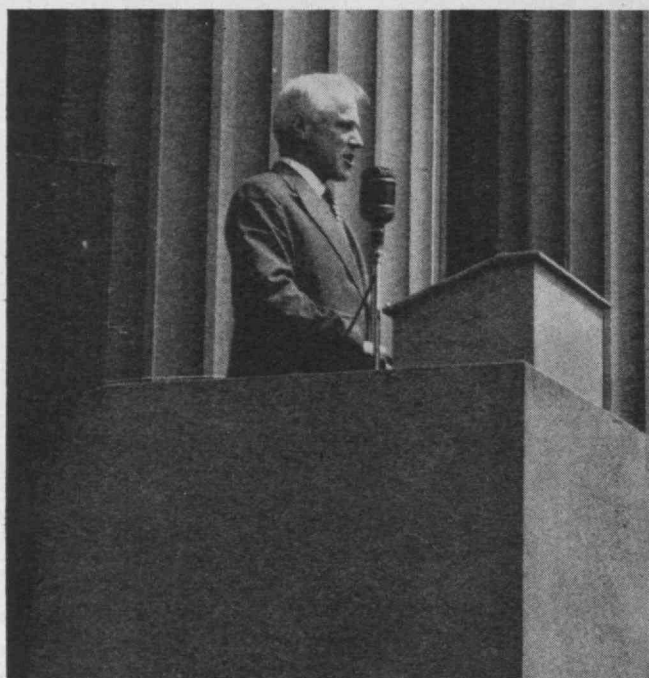
But the science photographer must make the truth so attractive that people will look and learn at once. For this reason his is intrinsically a creative task, with clarity as its object. So far, then, as esthetic considerations make for clarity, the science photographer is (Concluded on page 508)

All photographs by F. W. Goro, for LIFE Magazine



THE INSTITUTE GAZETTE

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M.I.T. Photo

President Compton addresses the V-E Day convocation.

On V-E Day

THRONGING the Great Court, several thousand M.I.T. people gathered in convocation at the call of President Compton for a half hour's ceremony in observation of V-E Day, May 8. Music by the band of the Navy V-12 unit stationed at Technology, invocation by the Rev. Carl Heath Kopf, minister of the Mount Vernon Church in Boston, addresses by four speakers representing varied aspects of the Institute's contribution to the war effort, and display of tangible evidence of victory in the form of a captured Nazi banner constituted the program, at the conclusion of which students and teachers returned to their classrooms, researchers to their laboratories, and officers to their responsibilities as Technology turned its efforts toward completion of its share in the second half of the task of bringing the war to an end.

After the singing of a verse of the national anthem by the gathering with the band and members of the Institute Glee Club, President Compton opened the convocation, saying:

This convocation brings together for the first time several parts of what my colleague, Mr. Killian, has called "the M.I.T. Galaxy," to describe M.I.T. under war conditions. On looking up the word "galaxy" in the dictionary, I found it defined as "an oasis of matter in a desert of emptiness." There is further verification in Mr. Killian's suggestion that wartime M.I.T. is like a galaxy when we note that galaxies — like the universe — are constantly expanding. And finally, Mr. Killian suggested that galactic systems have stars that blaze out suddenly to great brilliance, increasing their brightness perhaps a thousandfold. Obviously that describes our war projects. In our little ceremony this morning I am going to call upon some of the stars of first

magnitude in this galaxy, for we have many stars, large and small. The stars in this galaxy are some from Army, some from Navy, and some from civilian groups. The background for these stars is the Institute itself, our Alma Mater, and therefore the Milky Way of our astronomical analogy.

Citing the many aspects of the Institute's direct co-operation with the Army and Navy during the present emergency, President Compton then introduced in turn Captain R. H. Blair, senior naval officer at M.I.T.; Lieutenant Colonel John C. Dunbar, '25, commanding officer of Army Training Schools at M.I.T.; and Lieutenant Colonel Willard J. Slagle, '29, officer in charge of the Chemical Warfare Service Laboratory at the Institute. A statement by Admiral Ernest J. King, Chief of Naval Operations, was read by Captain Blair. Colonel Dunbar read General Orders from Major General Sherman Miles, Commanding, First Service Command, concerning the significance of the day. Colonel Slagle spoke briefly and impressively of the work thus far completed and the work that remains to be done.

Introducing F. Wheeler Loomis, associate director of the Radiation Laboratory at the Institute, Dr. Compton said: "The other great activity of wartime M.I.T. has been the research and development work carried on by dozens of groups working throughout the Institute. The largest of these groups is the Radiation Laboratory. The work of that laboratory and of the other groups has found embodiment in equipment that is carried on practically every ship of the Navy and by nearly every element of our forces on the ground and in the air. . . . The director of this laboratory has been back from the front in Germany only about a week, and I regret that he cannot be with us today. . . . He is ably represented by the associate director, Dr. F. Wheeler Loomis, who will speak on behalf of the research and development activities at M.I.T."

Recalling the past four and a half years' operation of the laboratory, Dr. Loomis said:

It was due to the wisdom and foresight of the M.I.T. Administration, and particularly of Dr. Compton, that the laboratory was started in November, 1940, when our country was in mortal danger, but while that mortal danger was still unrecognized and unheeded by many. Throughout four and a half years, Dr. Compton and M.I.T. have backed the Radiation Laboratory, taking considerable risks, supporting us in high quarters, and resolving every difficult question — and there have been many — by the sole criterion of its effect on the war.

Throughout four and a half years, the laboratory has carried on under the calm and wise and very bold leadership of its director, Dr. L. A. DuBridge. For four years and a half, it has drawn on the talents and ingenuity and enthusiasm and downright hard work of the original group of nuclear physicists and of the thousands who have joined it since.

It has never waited to be told what to do; it has often proceeded in the face of official discouragement and neglect. It has made bold commitments before it knew how to fulfill them and then has over-fulfilled them — not always on time!

It has developed, and in some instances produced, gear that has seen widespread use in almost every theater of war. . . . Each of us should be thankful for this opportunity. . . .

Because this opportunity has been so great, because each of you have been able to make contributions to the war effort far out of proportion to your individual strength and talents, you each have a unique responsibility.

Though our country is no longer in mortal danger, we still have a desperate and dangerous enemy. Our soldiers are still fighting and dying. We must not neglect any step which will contribute to an early, clear, and final end to the war.

I think you can count on the laboratory to continue to be foresighted, to make its own plans for the rest of the war, to keep going vigorously while it is needed, and to stop when the need is over. . . . Let us not quit — let's not even relax — until the job is done.

President Compton then called for the showing, as evidence of the actuality of V-E Day despite earlier uncertainty, of the captured battalion headquarters flag of a German panzer battalion, which had been presented to the Institute by Captain William W. Bainbridge, '22. Concluding the observance, Dr. Compton said:

There are about 7,000 men and women who work and study here at M.I.T., and all have ample reason today to be proud. I doubt whether there has ever before been a situation in the history of the world when an educational institution has had the opportunity which we have had during this war to make a notable contribution to the national welfare. We are very proud and glad that this institution has played so important a role, both in the war training programs and in the development of new weapons of offense and defense, as well as in the normal day by day activities of the Institute. In many of these training programs the Institute was unique in many of its offerings. In other instances it was one of a number of institutions, each of which took its share of the program.

To many there is some feeling of anti-climax about this V-E Day today. It does not come with unexpected suddenness. Consequently there will presumably be little of the celebration and parades which were characteristic of Armistice Day in the last war. I remember I was in Paris on that day, and I think it was the most exciting spectacle I have ever seen. Perhaps it was even more exciting over here.

When Germany surrendered, it was as many thought it should be, a peace without crushing victory, or nearly so. But that



M.I.T. Photo

didn't work. This time there is no question but that a victory has been won, and the enemy has been crushed. We can only hope and pray that the example of the crushing of Germany and its Nazi philosophy, to be followed by a similar crushing end to the conquering ambitions of Japan, will serve as an object lesson for generations to come of the fearful end of the aggressor, and that it will aid in maintaining a permanent peace.

This V-E Day is not only the culmination of events that we have known were coming, but I think it is worth while to think of it as marking the climax of the series of hard steps on the path to victory. It was only two years ago almost to the day when final victory in North Africa was secured, and it was only eleven months ago that the landing was made on the Normandy beachhead. We trust that with unswerving effort the same sequence of victorious steps will soon bring a similar end to the war in the Pacific. To this goal we pledge our continued service.

A partial view of the thousands of M.I.T. people who thronged the Great Court in convocation on V-E Day



M.I.T. Photo

The 79th Commencement

ACCCELERATION of the Institute's program because of the war means that June 25 will witness the graduation of the 79th class in Technology's history. At commencement exercises for the Class of 6-45, the address will be delivered by Captain Dashiell L. Madeira, director of training, Bureau of Naval Personnel. Some 250 degrees, it is expected, will be awarded by President Compton, who, in keeping with tradition, will address the students during the ceremonies. The invocation will be offered by Captain A. E. Stone, chief chaplain of the First Naval District.

In accordance with regulations of the Office of Defense Transportation, the entire commencement program will be restricted to local attendance, this provision applying to Class Day exercises on Saturday afternoon, June 23, to the Alumni Day Banquet at the Hotel Statler that evening, to baccalaureate services in Walker Memorial on Sunday afternoon, June 24, and to the events of commencement day itself.

A graduate of the United States Naval Academy in 1921, Captain Madeira in his present post is responsible for supervision of all naval training schools. As commander of a destroyer squadron during the invasion of Sicily in July, 1943, he was cited for brilliant tactical skill and was awarded the Navy Department Legion of Merit. The Gold Star in lieu of a second Legion of Merit came to him for outstanding services as commander of a destroyer and destroyer escort shakedown group for the Fleet Operational Training Command, Atlantic Fleet, from November, 1943, until September, 1944.

Harlow Shapley, noted astronomer, director of the Harvard College Observatory, and life member of the Corporation of the Institute, will deliver the baccalaureate address at baccalaureate services in Walker Memorial on Sunday, June 24, at three o'clock. The services will be conducted by the Rev. Carl Heath Kopf,

minister of the Mount Vernon Church in Boston. President Compton will give the scripture reading.

Class Day exercises will be held in New England Mutual Hall on Saturday afternoon, June 23. Alfred P. Sloan, Jr., '95, will speak for the 50-year Class, and an appropriate representation for the 25-year Class, that of 1920, will be given. An Alumni Day dinner for local attendance only will be held in the evening at the Hotel Statler, with Gerard Swope, '95, as principal speaker.

Promotions and Retirements

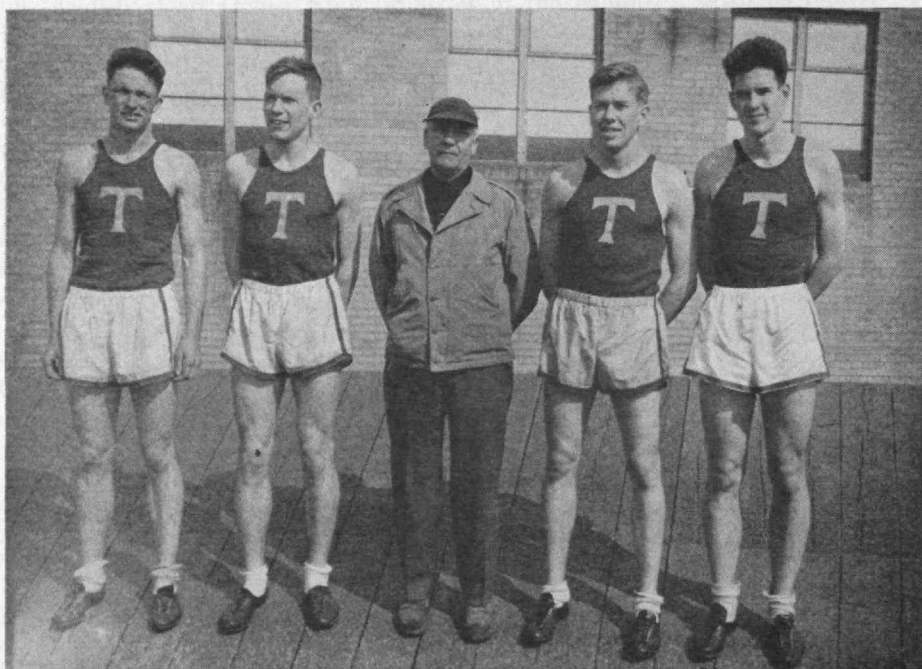
ADVANCEMENT of five Faculty members to full professorship at the beginning of the next academic year and the retirement of eight men who have served the Institute as teachers for a total of 291 man-years are among the staff changes announced by President Compton in May. The new professors are Robley D. Evans, Department of Physics; Henry G. Houghton, Jr., '27, and Hurd C. Willett, Department of Meteorology; John R. Loofbourow, Department of Biology; and B. Alden Thresher, '20, Department of Economics and Social Science. Professor Houghton was also named Head of the Department of Meteorology. Another new department head is Lieutenant Colonel John C. Dunbar, '25, who was detailed to the Institute by the First Service Command in April as professor of military science and tactics.

Eight Faculty members have been advanced to the rank of associate professor. They are Isadore Amdur, Edmund L. Gamble, '30, and George G. Marvin, '22, Department of Chemistry; Alexander J. Bone, '24, Department of Civil and Sanitary Engineering; Francis M. Currier, Department of Modern Languages; John A. Hrones, '34, and William M. Murray, '33, Department of Mechanical Engineering; and Reinhardt Schuhmann, Jr., '38, Department of Metallurgy.

Promoted to the grade of assistant professor are the following members of the staff: Michael B. Bever, '42, Department of Metallurgy; Sanborn C. Brown, 10-44, Martin Deutsch, '37, Herman Feshbach, '42, and Laszlo Tisza, Department of Physics; James V. Eppes and Robert Plunkett, '39, Department of Mechanical Engineering; Pei-Moo Ku, '42, and Robert C. Seamans, Jr., '42, Department of Aeronautical Engineering; Ernest E. Lockhart, '34, Department of Biology; and Walter W. Robertson, Department of Naval Architecture and Marine Engineering.

Newly appointed assistant professors who will join the Institute Faculty are Dorwin Cartwright, Department of Economics and Social Science; Nicholas J. Grant, 2-44, Department of Metallurgy; Roland B. Greeley, School of Architecture and Planning; and Arthur F. Kip, Department of Physics.

Retiring with the title of professor emeritus at the end of the present (Continued on page 522)

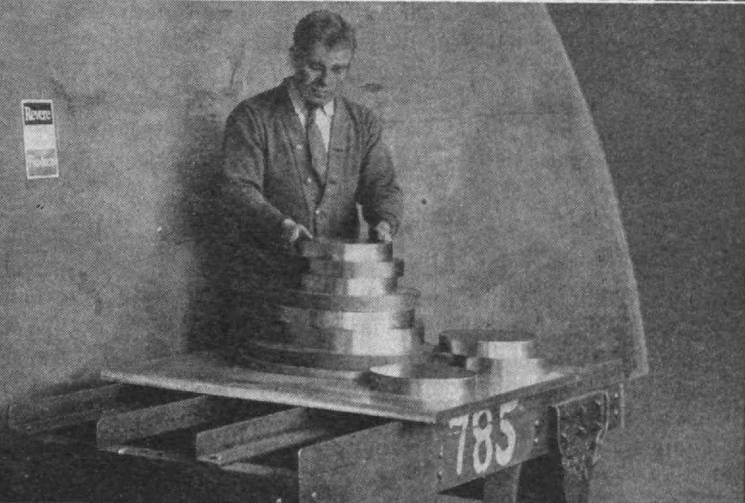
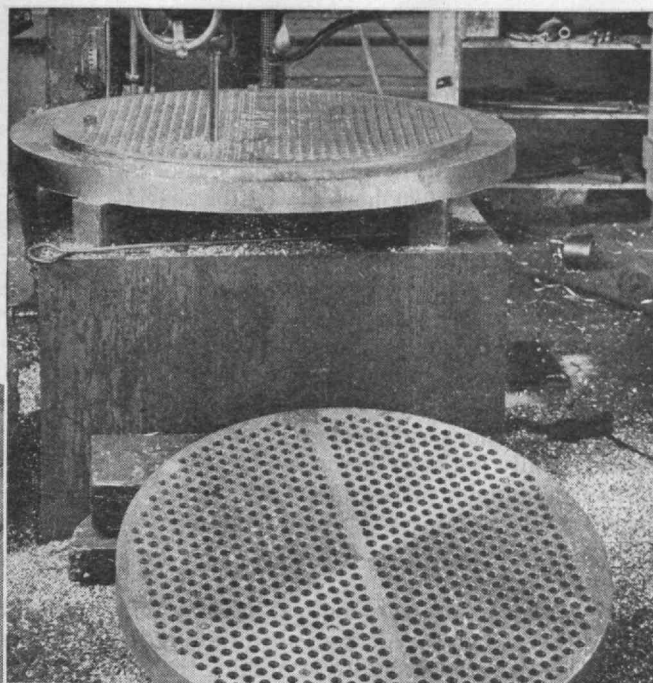


Technology's 1944-45 relay quartet, holders of the ICAAAA title for the indoor two-mile relay, at a time of 8:02.3. Left to right: John Serrie, 6-46, Charles Goldie, 6-45, Coach Oscar Hedlund, Royce Crimmin, 10-44, and Joseph Shea, 10-46.

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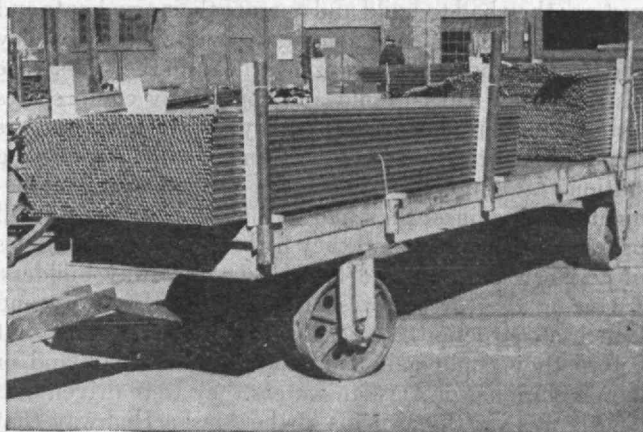


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THE TREND OF AFFAIRS

(Concluded from page 486)

propulsion program, is the development of gas turbines in the order of 5,000 horsepower for driving airplane propellers. Unlike the extremely complicated reciprocating engine, turbines could be custom-designed for specific airplanes with every expectation of burying the turbine completely in the wing, and these turbines may easily have half the weight per horsepower of present airplane engines. As rotary compressors improve in efficiency and as better heat-resisting materials are developed, many other applications will become economic, for either factor would rapidly improve thermal efficiency. At present, the moving and highly stressed parts of gas turbines are subjected to temperatures of about 1200 degrees F., where the finest products of the metallurgist's art behave about as does cast iron at ordinary steam temperatures.

For pure jet propulsion motors, the major postwar field seems to be high-speed, high-altitude aircraft. Rockets may have a fairly large use in probing the upper atmosphere for meteorologists, their advantages over sounding balloons having been often pointed out. And shining more brightly than ever as a result of wartime improvements in fuels and techniques is "the great dream," as the most ardent rocketeers describe their now not quite so extravagant goal, the possibility of entering into space itself.

ALASKA AND THE ENGINEER

(Continued from page 488)

Norman Wells to Whitehorse; (3) the construction of a refinery at Whitehorse; (4) the laying of a 110-mile pipe line between Whitehorse and tidewater at Skagway; (5) the laying of a pipe line from an intermediate point on the Skagway-Whitehorse line to Watson Lake, an airport 265 miles eastward; (6) the laying of a pipe line from Whitehorse 600 miles northwestward to Fairbanks.

To accomplish these tasks, the Army and Bechtel-Price-Callahan had to set up their own transportation system; they had to build and operate their own boats and barges on 1,100 miles of the Mackenzie waterway; they had to build and operate a dozen airfields in the Mackenzie district; they had to build and completely equip scores of big semi-permanent camps; they had to build various terminal facilities and ten tank farms, as well as pumping stations at 50-mile intervals along the main and supplementary pipe lines; they had to build innumerable small bridges and culverts; and they had to pioneer more miles of access roads than did the Alaska Highway builders.

During the early stages of the Alaska Highway and Canol construction, Japs invaded the Aleutians, but before they could gain a foothold on the mainland or harass shipping in Alaskan waters they were driven out. And it was via the airfields of the Alaska Highway that many of the defending planes flew, and it was gasoline pumped through the supplementary pipe lines of Canol that helped to speed the planes on their way. (It was California gasoline, however, for the supplementary lines were in operation a year before the Canol crude line from Norman Wells could be completed.) To the Soviet Union by the same route flew thousands of Lend-Lease planes to enter the campaign against Germany in the East.

While the airports and flight strips in the Mackenzie district, and in the Yukon and Alaska, were being constructed or enlarged, airports were appearing also in the eastern part of the North American North. In Hudson Bay, Baffin Island, and Labrador, they were serving as patrol and transatlantic ferry bases.

Shortsighted and forgetful people have condemned Canol and even the Alaska Highway as a waste of money and unnecessary to the prosecution of the war. Such people have overlooked or minimized the grave situation that prompted the construction of these projects, and they have not realized that these projects have already made substantial contributions to military necessity. Indeed, until the Japs are vanquished and until peace reigns throughout the world forever, the Alaska Highway and its airfields, and the Canol Project and its appurtenances, will remain of great strategic importance.

For World War II many a military installation has been created at high cost only to be abandoned as useless because the fighting didn't happen to pass just that way. Our northern installations — whether they contributed directly to the fighting or not — are notable exceptions. The Alaska Highway, the Canol Project, and all the airfields and roads spread across Subarctic Canada and Alaska during this war need not be written off. Irrespective of their present military value they have more than justified themselves in opening up thousands of square miles of virgin country to postwar development.

These projects have also introduced scores of thousands of people, both soldiers and civilians, women as well as men, to a new and exciting land — a land that proved habitable and quite different from the bleak story-book picture of the High North; a land offering opportunities galore to ambitious, adaptable, and imaginative pioneers. A lot of those wartime residents of the North will return in peacetime with their families and friends, either to visit or to settle, and many others hoping to carve out new careers for themselves will also be attracted there.

And what can they do to make a living? Here are a few of the things to be done; here are some of the opportunities. They may be grouped under the main headings: (1) transportation: by land, water, and air; (2) tourist traffic; (3) mining; (4) fishing; (5) fur farming; (6) lumbering; (7) agriculture and stock raising. The opportunities will be self-evident.

Already, some of the leading flying companies are vying for northern concessions. They know that the shortest routes between northern population centers in the Western Hemisphere and those in the Eastern Hemisphere are across the Polar Mediterranean. There is bound to be a great deal of transpolar flying after the war. Most of the existing bases in the North will be used and others will be built for both long-distance and local traffic.

The Alaska Highway must be maintained, and sooner or later its gravel surface will be topped with oil from the tar sands of Fort McMurray (the greatest known oil reserve in the world, 300 miles north of Edmonton). Eventually the highway will be extended to Tanana and Nome, and a tunnel may be bored 50-odd miles under the Bering Sea to connect North America with Asia.

And soon there may be a railroad pushing northward from Prince George, British Columbia, via the Rocky Mountain trench to the Yukon and Alaska. The route

(Concluded on page 506)



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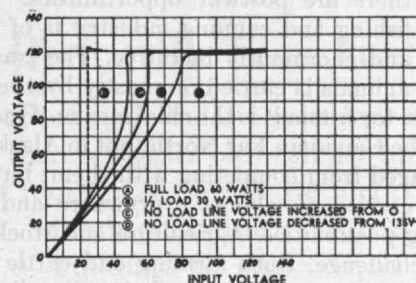
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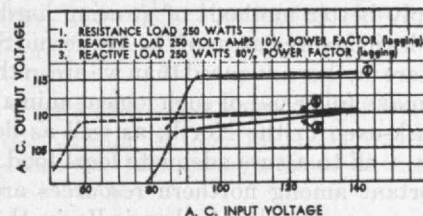
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ALASKA AND THE ENGINEER

(Concluded from page 504)

was surveyed prior to the building of the Alaska Highway, and it has been declared perfectly feasible, with no grade as much as 1 per cent.

The winter road which now runs down the valley of the Mackenzie River as far as Norman Wells (it was pioneered in 1943 to carry freight for the Canol Project) will one day be turned into an all-weather artery and continued to the Arctic Coast. It already ties in with a railhead and a provincial highway near the town of Peace River; so when it is completed it will provide year-round access between the rich Mackenzie Basin and the outside world.

On the Canol Project and the Alaska Highway much knowledge was gained and applied in road- and airfield-building and other construction where the subsoil was permanently frozen to varying depths down to 100 feet, and where springs bubbled out in the dead of winter to create ice barriers; and much was learned about the cold-weather operation of machinery; but there remains a great deal of studying and experimenting to be done by engineers in these fields. Incidentally, a fortune awaits the man who can exterminate mosquitoes and black flies in settled areas in the North, where, though they carry no disease, they cause great annoyance in summer.

Right after the war, the moment that gasoline and tires are plentiful and there are no longer any travel restrictions, there will be tourists in the eastern Arctic and more tourists in the Mackenzie River valley, in the Yukon Territory and Alaska, and a lot of them will be driving over the Alaska Highway. Wherever they go they will require goods and services.

In northern fishing, fur farming, agriculture, and stock raising there are postwar opportunities. The Alaskan salmon fishing and canning industry is of course world famous and enormously lucrative. The trapping of fur-bearing animals is carried on mostly by the Indians and Eskimos, for whom it is the chief means of making money, and in the Canadian Far North (not in Alaska) whites are discouraged from competing with them; but fur farming can be carried on almost everywhere and it offers interesting possibilities. Agriculture and stock raising present a challenge. Both farming and cattle raising have been carried on in Alaska and the Canadian Far North for many years, but only in a limited and usually unscientific way. Great subjects for investigation are to find and apply better methods of growing hardy grains and vegetables in favored areas of the Arctic and Subarctic (the Soviets are farther advanced than we are in this direction), and to make fuller use of such logical animals as reindeer and musk-oxen in the North, as well as domestic farm animals — all to assure adequate local food supplies.

Important among northern resources are the forests which cover most of the Mackenzie Basin, the Yukon, and Alaska. Spruce, jack pine, poplar, and birch are widespread, and everywhere except on the Arctic prairies may wood be found for local fuel and building purposes. Along the southern coast of Alaska are 4,000,000 acres of spruce and hemlock used for everything from shingles to piles and capable of supplying 1,000,000 tons of newsprint a year in perpetuity.

There is another northern resource that can be harnessed as need arises — namely, water power. So far it has scarcely been touched, although promising sites have

been located on a number of the large rivers. At Yellowknife, on Great Slave Lake, hydroelectric power was developed a few years ago on the Yellowknife River, and it has since served the town and the neighboring mines.

It is in mining that the North offers the most enticing prospects for the immediate future, for on mineral development at the outset must depend the development of most of the other resources of the country. Prospecting and mining will bring in new settlers; other supporting activities will enable them to stay.

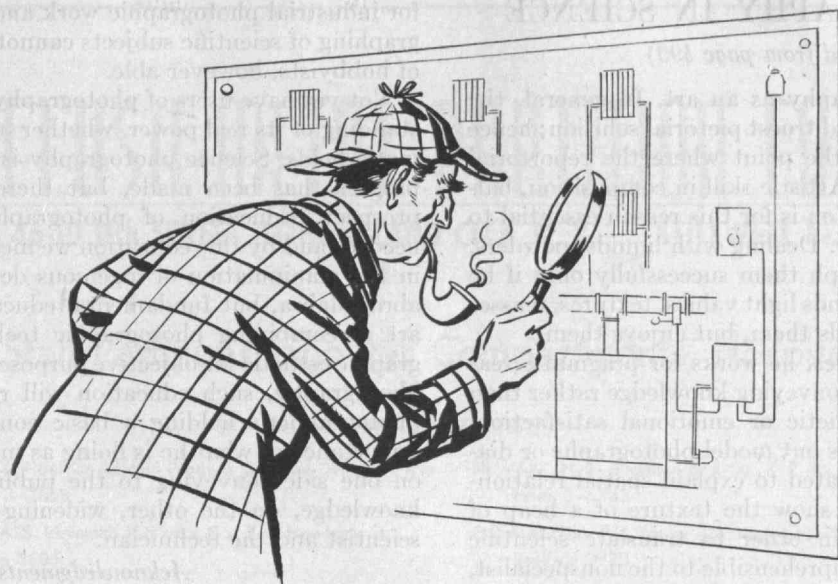
The value of the annual output of pitchblende, silver, and gold now far exceeds that of fur in the Canadian sector of the High North, yet these ores have so far been exploited only in a few small areas; and, excluding petroleum, other minerals have hardly been scratched. Coal is widely distributed, but that found has been mostly of low grade and has not been worked to any extent. (Alaska has good coal, producing a hundred thousand tons or more a year.) Copper, lead, zinc, and other industrial metals, including tungsten, platinum, and tantalum, are in the Northwest Territories but only recently have they been given serious attention. The Yukon, of course, has ranked with Alaska in copper as well as gold production in past years, and dredging and hydraulic methods long ago replaced the gold pan of the Klondike. Alaska has done well in mineral production, exporting not only gold, silver, and copper, but some platinum, lead, tin, and other mineral commodities, totaling over \$800,000,000. Still, less than half of Alaska has been surveyed topographically or geologically, and as much or more work in this direction remains to be done in the Canadian North.

Much of the great Mackenzie Basin is favorable for petroleum discoveries, yet intensive drilling has been done only within the purlieus of Norman Wells. (Most of this drilling was part of the Canol Project, which proved the existence of a major field.)

Oil production in Alaska has so far been small. One or two fields were tapped a few years ago, notably in the Katalla district on the Gulf of Alaska. But there is a potentially important source south of Point Barrow on the Arctic Coast. Seepages were observed there as early as 1886 by the late Charles Brower, and in 1923 the U. S. Navy set aside 3,000 square miles north of the Endicott Range as a petroleum reserve. Thereafter it was visited from time to time by geologists, who were uniformly impressed. But no thorough investigation was undertaken until very recently, when a party of Seabees began probing around Cape Simpson, 50 miles from the settlement of Barrow. The day may not be far distant when Barrow crude will be shipped round the Arctic Coast through Bering Strait to ports in southern Alaska and elsewhere, or a pipe line may be laid from the Barrow vicinity to Fairbanks, where a refinery could be erected.

All in all, Alaska, the Yukon, and the Northwest Territories have tremendous possibilities. Their combined area of 2,000,000 square miles of forests, plains, mountains, lakes, and rivers certainly has room enough for a considerably larger population than the present permanent one of around 75,000 whites, Indians, and Eskimos.

Alaska and the Canadian Far North offer unlimited scope for the sort of engineering that has been defined as "The art of directing and controlling men and the forces and materials of nature for the benefit of the human race."



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ON PHOTOGRAPHY IN SCIENCE

(Concluded from page 499)

concerned with photography as an art. In general, the creative is the clearest and truest pictorial solution; hence science photography is the point where the reportorial and the esthetic merge. Artistic skill in composition, balance, proportion, and so on is for this reason essential to the science photographer. Dealing with liquids, powders, metals, he will photograph them successfully only if he has studied and understands light values, textures, masses — not merely understands them, but enjoys them.

In making such pictures, he works for pragmatic reasons, with the object of conveying knowledge rather than imparting primarily esthetic or emotional satisfaction. Nevertheless, as he works out model photographs or diagram photographs calculated to explain spatial relationships, or as he seeks to show the texture of a heap of minute shiny crystals, in order to translate scientific activity into pictures comprehensible to the nonspecialist, he must consciously utilize an esthetic means for a pragmatic as well as an esthetic purpose.

It should be said in passing that photography is so easy to use as a tool that it is often treated rather badly as a skill. Consequently, the photography of science has often suffered from ignoring the fact that the excellent amateur may still be a very poor expert, and from the fact that the approach of many people to photography is from the fascination of the gadgetry of cameras or the witchcraft of the chemistry of processing. If the full potentialities of photography in science are to be realized, responsibility

for industrial photographic work and for planned photographing of scientific subjects cannot be left in the hands of hobbyists, however able.

Not yet have users of photography reached full understanding of its real power, whether in esthetic or in pragmatic fields. Science photography is no exception. Good progress has been made, but there is much travel in prospect. Education of photographers is imperatively needed, and by this education we mean not mere training in the manipulation of ingenious devices or in chemical abracadabra, but fundamental education in the delicate art of combining photographic technology and photographic esthetic for objective purpose. As concerns science photography, such education will result in the science photographer's holding a basic conviction of the deep importance of what he is doing as middleman of science; on one side conveying to the public at large scientific knowledge, on the other, widening the horizon of the scientist and the technician.

Acknowledgments

Page 495: Flashover taken at High Voltage Laboratory, Westinghouse Company, Trafford, Pa. Pages 496-497: Penicillin at Northern Regional Research Laboratory, United States Department of Agriculture, Peoria, Ill.; Quartz Illuminator with Dr. Melvin Kniseley, University of Chicago; Tuberculin Patch Test at Lederle Laboratories, New York; Barnacles with Dr. Charles M. Pomerat at United States Bureau of Fisheries, Pensacola, Fla.; Cockroaches at Purdue University, Ind. Pages 498-499: Flames at Eimer and Amend, New York; Day and Night Vision with Dr. Walter Miles, Yale University; Fibrinogen with Dr. Edwin J. Cohn at Harvard Medical School; Projector at Hayden Planetarium, New York.

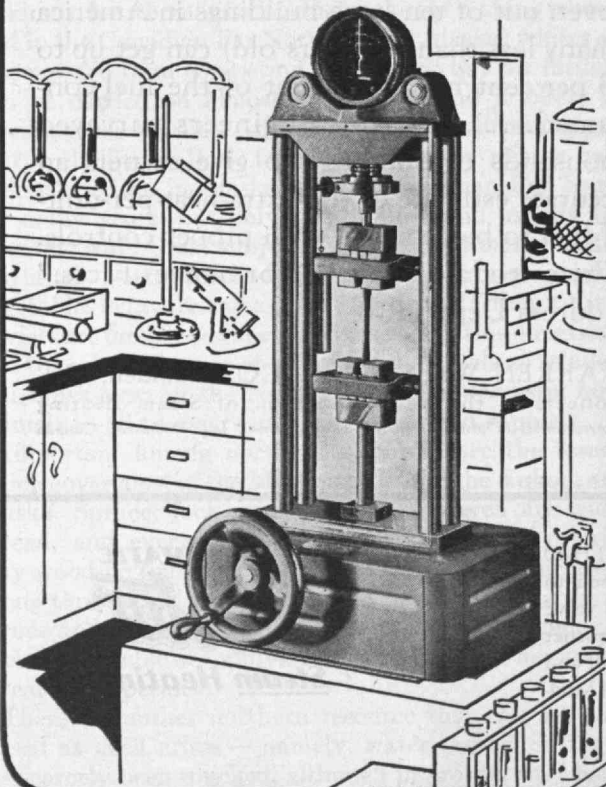
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RESEARCH IN SPITE OF WAR

(Continued from page 490)

classification and great ease in handling. It also permits a greater freedom of set-up in contrast to the periodical obliged to come out at fixed times in more or less constant volume.

In this manner we were able, during the period of occupation, to send out ostensibly private and confidential titles to the number of about 120, unknown to the occupying authority and, as a matter of fact, without infraction of its rules. I brought to the United States the microfilm of all of these circulars and presented to M.I.T. a set of prints, the list of which appears at the end of this article. Anyone interested in any of these publications may place his request with the French Supply Mission, Documentation Service, who can have the microfilm copied.

Scientific Research. As explained in the introduction, the Laboratory of Building and Public Works functions in parallel with the Technical Institute. It is organized in the following manner:

1. Administration

Director: Robert G. L'Hermite

Assistant director: Jacques Florentin

Secretariat

Administration

Technical

Corresponding

2. Laboratories

(a) Department of metals

(metallography, tests, mechanics)

(b) Department of chemistry

(chemistry of cements, metals, water)

(c) Department of cements and concretes

(design of concretes, standard tests, mechanical tests, and physics of concretes)

(d) Department of building materials

(brick, tile, slate, plaster, fiber-cement)

(e) Department of testing machines

(conception, study, construction, and improvement of testing equipment)

(f) Department of plastics

(physical and mechanical properties)

(g) Department of physics

(extensometry, dilatometry, thermal conductivity, vibrations, piezo-electricity)

(h) Department of soils and foundations

(soil mechanics, stabilized earth, thrusts of soils and of powdered materials)

(i) Department of waterproofing and painting

(bituminous products, paints)

(j) Department of construction

(tests of structures, floors, vaults, reinforced concrete, steel trusses, masonry)

Each department has a laboratory chairman, one or several assistants, and technicians and workmen. In all there are about 60 technicians and engineers. The equipment is considerable and is of very modern types. It includes among others 25 tension machines powered from 50 kilograms to 10,000 tons. The latter, especially built for the laboratory, is composed of a tunnel of pre-stressed concrete 15 meters long, and from 4.50 to 3.50 meters in inside section, into which a real structural element or a part of a large assembly can be introduced. Mobile hydraulic jacks on rails can be disposed in any

(Continued on page 512)

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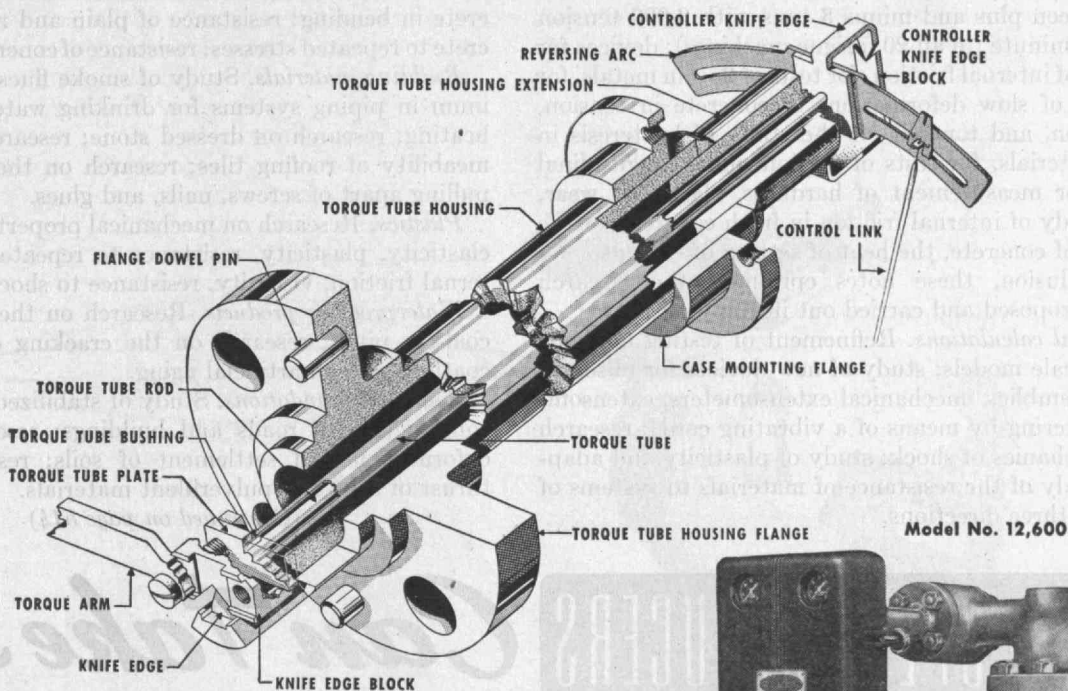
LAZARE GELIN '28, President

THE HEART

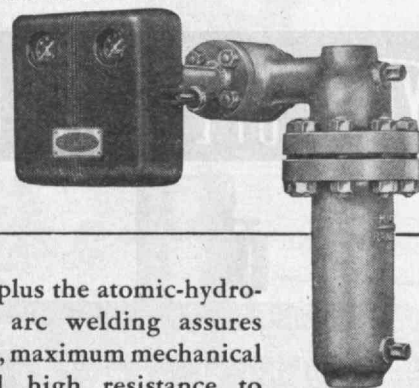
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RESEARCH IN SPITE OF WAR

(Continued from page 510)

direction so as to reproduce any pattern of forces. In this machine we have tested to destruction bridges of metal and of reinforced concrete at natural size or in one-half or one-fourth reduction. Naturally every accessory necessary for measurement is provided: extensometers, dilatometers, and so on. It is impossible in an article to describe all the details of this equipment, a collection continuously expanded by new acquisitions and by elements devised and built by the technicians themselves. Included, among others, are a machine for fatigue tests from zero to 55 tons with 500 cycles per minute; machines for fatigue tests between plus and minus 3 tons with 3,000 tension cycles per minute (in all 20 fatigue machines); devices for the study of internal friction, for tests of flow in metals, for the study of slow deformations of concrete in tension, compression, and torsion, for the study of hysteresis in plastic materials, for tests of torsion under longitudinal tension, for measurement of hardness, elasticity, wear, for the study of internal friction in fresh concrete, of the vibration of concrete, the heat of setting of cement.

In conclusion, these notes epitomize the research program proposed and carried out in the year 1943:

Structural calculations. Refinement of testing methods on small-scale models; study of new devices for observation of assemblies (mechanical extensometers, extensometers registering by means of a vibrating cord); research on the mechanics of shock; study of plasticity and adaptation; study of the resistance of materials to systems of stresses in three directions.

Mechanics of metals. Research on resistance to repeated stresses; research on the behavior of metals at low temperatures; study of the influence of speed (frequency) on plasticity; research on the resistance of welds to repeated stresses.

Cements. Study of the hydration of cements and the influence of temperature and humidity on hardening; study of alteration in aluminous cements; study of the influence of fire on the mechanical resistance and behavior of cements.

Plain and reinforced concrete. Research on granulometry; elastic deformation of concrete; plastic deformation of concrete under load and shrinkage adherence of steel to concrete; plastic deformation of reinforced concrete in bending; resistance of plain and reinforced concrete to repeated stresses; resistance of concrete to freezing.

Building materials. Study of smoke flues; use of aluminum in piping systems for drinking water and central heating; research on dressed stone; research on the permeability of roofing tiles; research on the resistance to pulling apart of screws, nails, and glues.

Plastics. Research on mechanical properties of plastics: elasticity, plasticity, resistance to repeated stresses, internal friction, viscosity, resistance to shock.

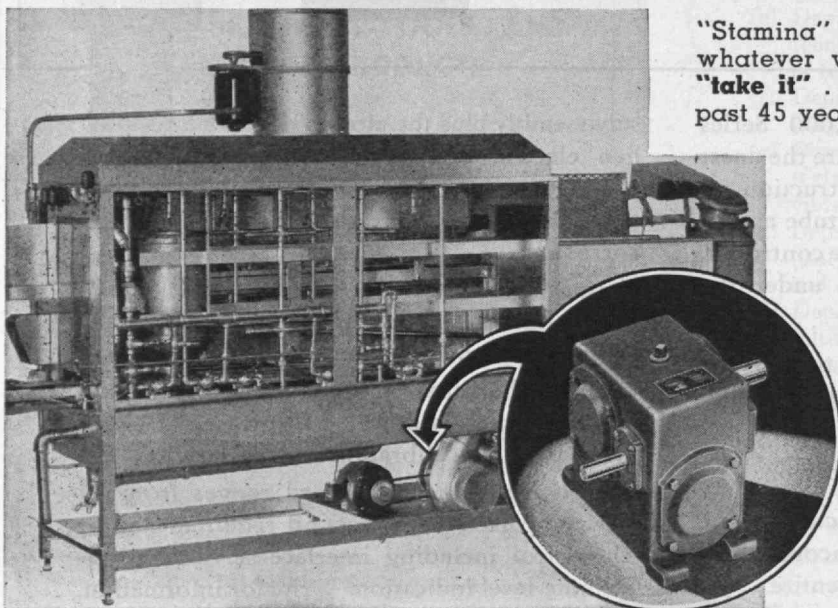
Waterproofing products. Research on the utilization of coal-tar pitch; research on the cracking of bituminous coatings and on artificial aging.

Soils and foundations. Study of stabilized earth for the construction of roads and buildings; research on slow deformation and settlement of soils; research on the thrust of soils and pulverulent materials.

(Continued on page 514)

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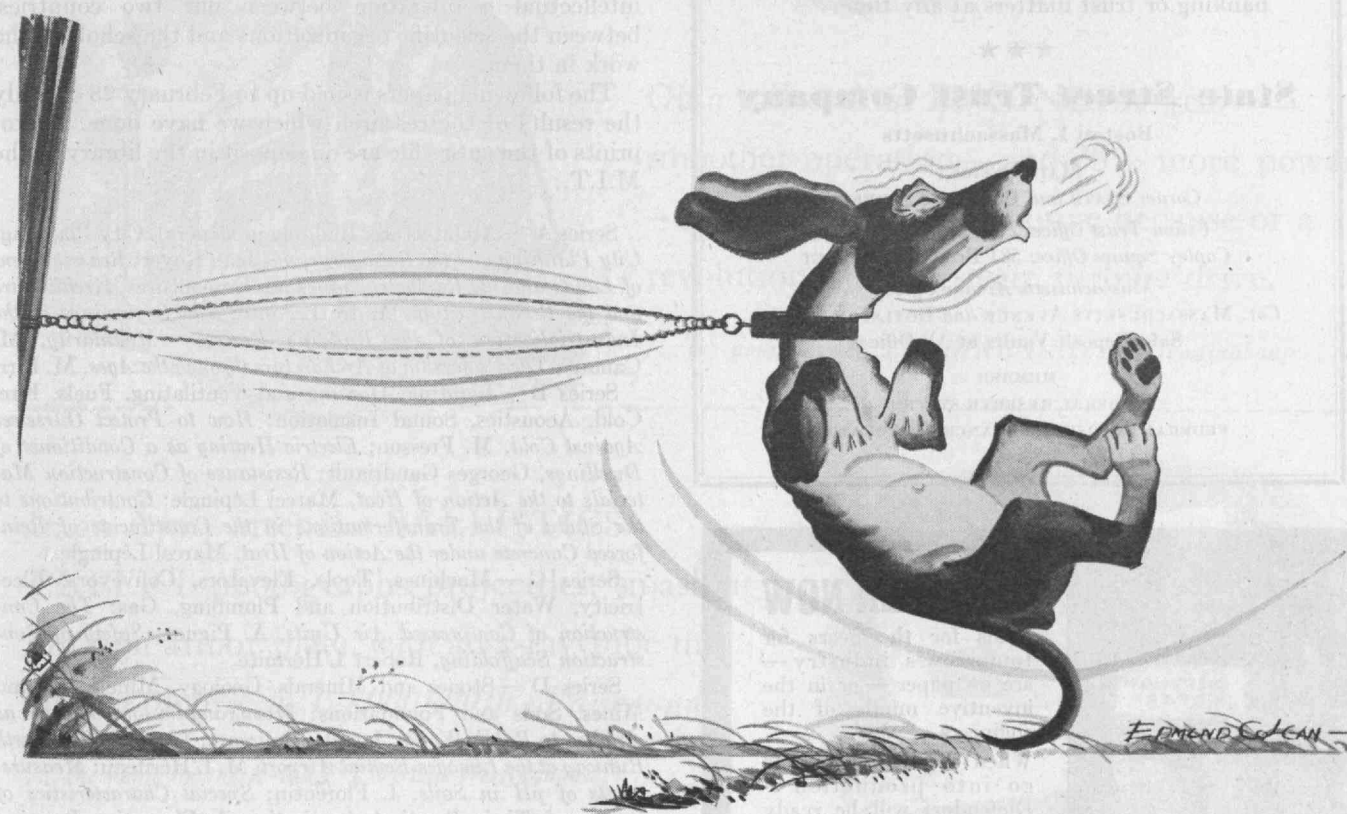
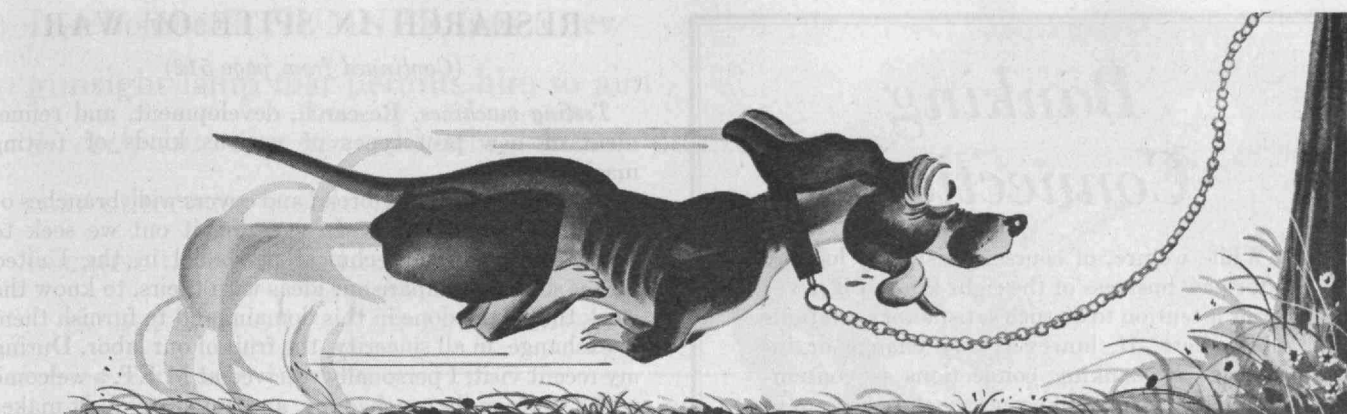
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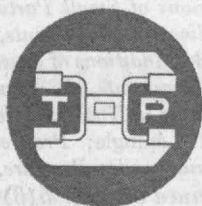
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RESEARCH IN SPITE OF WAR

(Continued from page 512)

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The following papers issued up to February 28 embody the results of the research which we have done. Photographs of the entire file are on deposit in the library of the M.I.T.:

Series A — Architecture, Building in General, City Planning: *City Planning and the Reconstruction*, Jean Royer; *Reassignment of Lands and the Reconstruction*, Jean Descoutures; *Architecture and the Reconstruction*, André Leconte; *The Beginnings of the Industrialization of the Building Process — Modularity*, M. Canaux; *The Profession of Architecture through the Ages*, M. Birr.

Series B — Lighting, Heating and Ventilating, Fuels, Fire, Cold, Acoustics, Sound Insulation: *How to Protect Ourselves Against Cold*, M. Fresson; *Electric Heating as a Conditioner of Dwellings*, Georges Gaudriault; *Resistance of Construction Materials to the Action of Heat*, Marcel Lépling; *Contributions to the Study of the Transformations in the Constituents of Reinforced Concrete under the Action of Heat*, Marcel Lépling.

Series C — Machines, Tools, Elevators, Conveyors, Electricity, Water Distribution and Plumbing, Gas: *The Construction of Compressed Air Units*, A. Pignot; *Safety of Construction Scaffolding*, Robert L'Hermite.

Series D — Stones and Minerals, Geology, Mineralogy and Mines, Soils and Foundations: *Memorandum on Geology as Applied to Public Works*, Jacques Bourcart; *The Stabilized Earth Runway at the Limoges-Feytiat Airport*, M. L'Hériveau; *Measurements of pH in Soils*, J. Florentin; *Special Characteristics of Soils and Their Practical Application*, J. Florentin; *Practical Guide for Recognition of Rocks*, Jacques Bourcart; *Tests and Research on Dressed Stone*, *Tests and Research on Calcareous Stone*, Robert L'Hermite; *Roads of Soil-Cement*, J. Florentin.

Series E — Glass, Brick, Tile, Refractories, Porcelain, Enamels, Pottery, Paving Tile, Ceramics: *Ceramics in Building*, Henri Lafuma; *Composition, Tests, and Uses of Refractory Products*, Marcel Lépling; *Asbestos-Cement in the Reconstruction*, M. Quillard; *Glass in Building*, Henri Lafuma.

Series F — Cements, Hydraulic Binders, Concrete, Reinforced Concrete: *Permeability of Concrete to Hydrocarbons*, Henri Nalet; *Contribution to the Study of the Internal Mechanics of Concrete*, Robert L'Hermite; *Study of the Electrical Conductivity of Concretes*, Roland Decoux; *Behavior of Concretes at High Temperatures*, Marcel Lépling; *Tests of Reinforced Concrete Joints*, Robert L'Hermite; *Notes on the Use of Cements with a Slag Base*; *Action of Heat on Changes in Hydraulic Binders*, Marcel Lépling; *Dimensions of Small Particles: New Methods of Measurement and Applications to Cements, Clays, Soils, Pigments, etc.*, Marcel Lépling; *Additions of Powdered Stone to Lean Concretes: Resulting Improvements*, J. Faury; *Slag Cement*, Cléret de Langavant; *Changes in Hydraulic Cements Hydrated by Action of Heat*, Marcel Lépling; *Prestressed Hoop-banded Concrete Conduits for Fluids under Pressure*, A. Guerrin; *The*

(Continued on page 516)

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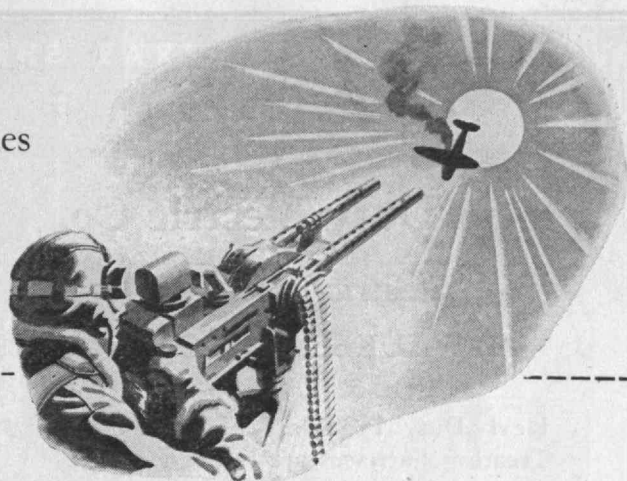
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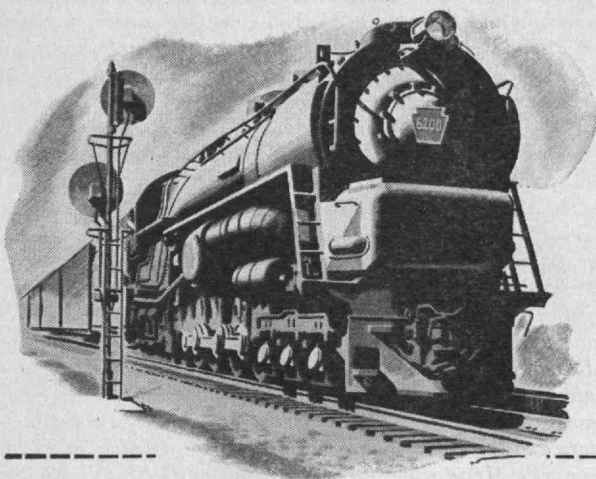
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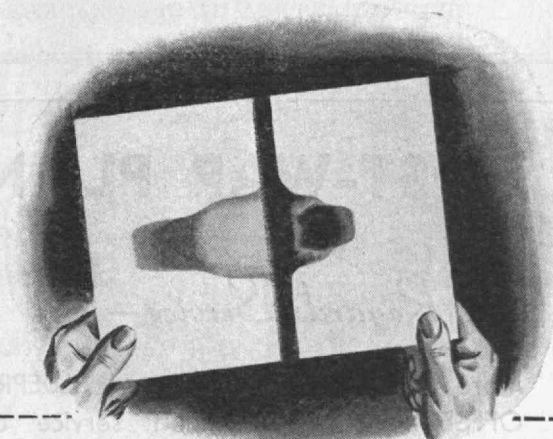
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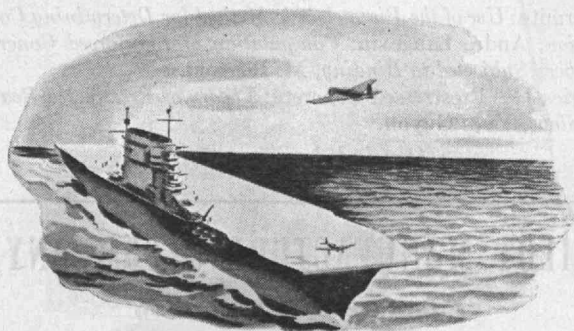
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RESEARCH IN SPITE OF WAR

(Continued from page 514)

Centenary of François Hennebique, Robert Flament-Hennebique; German Standards for Acceptance of Cements Din 1164 — Portland Cements, Iron Cements, Blast Furnace Cements; Resistance to Compression, Tension, Bending, and Shearing, René Feret; Plaster Concrete, M. Faury; Use of Plaster to Obtain Comfort in Dwellings, Pierre Gilardi; Computation of Sections in Reinforced Concrete, Jorgen Rudinger; Notes on Vibration of Concrete During Setting, F. Bastian; Behavior of Concrete around Reinforcement, Robert L'Hermite.

Series G — Metals, Steel Trusses, Welding, Metallurgy: *Corrosion of Metals, N. Goldowski; Behavior of Metals at Low Temperatures, Robert L'Hermite; Usages of Light Metals in Construction and Decoration, M. Eyglunet; Research on Plastic Deformation, Robert L'Hermite; Autocorrosion and Electrolysis of Buried Piping, A.-J. Maurin; Study of Corrosion in Aluminum Pipes, Henri Lafuma; Applications of the Processes of Autogenous Welding in the Building Industry, M. Gerbeaux.*

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(Concluded on page 518)

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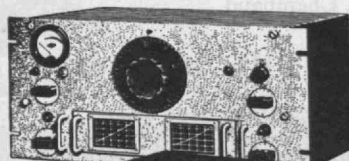
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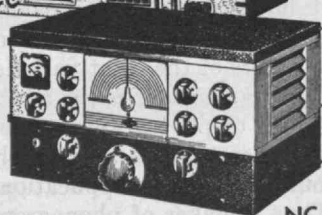
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(Concluded from page 516)

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Series L — Juridical Questions, Economic Questions, General Questions, Control, Hygiene and Safety: *The Committee on Organization of Building and Public Works — Its Functions, What the Architects and Engineers Should Know*, M. Roland Pré; *The Library of the Laboratories of Building and Public Works; Research Plan of the Laboratories of Building and Public Works; The Work Chart*, M. Nicolas; *The Professional Organization of Safety in Buildings and Public Works*, Froment; *Proportional Salary*, André Boyer; *Materials Economy in the Present and in the Future*, P. Salmon; *Influence of Surrounding Thermal Conditions on Work Capacity, Morbidity and Mortality of Workers and the Construction of Working Places*, A. Missenard; *Work Accidents and Their Psychophysiological Causes*, Jean Perrin.

Series M — Practical Encyclopedia: *Spots and Efflorescence of Masonry; Steels for Reinforced Concrete; Action of Calcium Sulphate on Cements; Cinders; Shrinkage in Concrete; Copper; Attack on Zinc by Plaster; Calcium Chloride; Special Core Drill for Removing Undisturbed Specimens; Brasses; Plaster.*

Series X — Technical Documentation: *Technical Documentation.*

Series Z — Reinforced Concrete Manual: *French Handbook of Reinforced Concrete; Formulas and Numerical Tables for the Rapid Calculation of Rough-Walling in Reinforced Concrete*, R. Chambaud; *Numerical Tables for Calculation of Complex Bending in Reinforced Concrete Members of Rectangular Section Without Compression Steel*, P. Lebel; *Contribution to the Study of Mushroom Floors*, H. Bordier; *Practical Rules for Calculation of Reinforced Concrete Mushroom Floors*, R. Chambaud; *Rapid Calculation of Reinforced Concrete Beams of Rectangular Section with Compressed Reinforcement*, R. Chambaud; *Survey and Estimate of Reinforced Concrete Structures*, G. Javay; *Rapid Calculation of Reinforced Concrete Beams with Compression Table*, R. Chambaud; *Calculation of Complex Bending in Reinforced Concrete Members of Rectangular Section*, R. Chambaud; *Unit Time Schedules for Construction Labor, Simple and Complex*, G. Javay; *Calculation of Ribbed Reinforced Concrete Beams and Compression Tables*, R. Chambaud.

ON ART AND THE PHOTOGRAPH

(Continued from page 494)

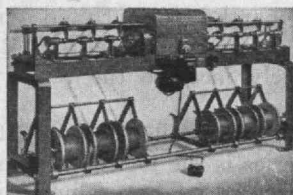
We do not yet have commonplace evidence of this recognition, as far as *abstract seeing* is concerned. But we do have it for two others of the eight varieties of photographic vision — for *simultaneous seeing* and for *distorted seeing*. These two uses of photography as a medium of artistic expression rather than as a primarily reporting technique have found pioneering application already in advertisements. Thus a maker of phonographs employs superimposition in his advertisements as a means of sug-

(Continued on page 520)



*

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ON ART AND THE PHOTOGRAPH

(Continued from page 518)

gesting the dreaminess or the exaltation afforded by music. A maker of furnace regulators meantime is using bas-relief prints made by superimposing a negative and a positive transparency out of register, presumably for the strange evocative power which they give. In these utilitarian adoptions of two essentially artistic devices — as in the now familiar adoption of photomontage — are signs of the development that is to come.

Superimposition is the best of all visual means to record dreams or dreamlike contents. It overcomes space and time fixations, unites strange and diverging subjects into new entities. It is the transfiguration of insignificant singularities into meaningful complexities, of banalities into vivid illumination. The transparent quality of superimpositions often suggests transparency of the contents as well, revealing unnoticed structural qualities of the objects used.

Photomontage, which goes back to the cubist collages but has developed its own technique, was known to the old-time photographers who sometimes had to assemble individual photographs into group pictures. In this type of patchwork photomontage, the intention was to present a normal camera record. Around 1920, the Dadaists in their general attack on "beauty" as such enlarged upon the meaning of such photomontage with crudely glued-together mosaics of single elements. Later, photomontage arrived at a more rationally organized form somewhat easier to grasp, though with the interpenetration and fusion of strange relationships normally not recognized. Thus it developed toward the recording of problems occurring on the threshold between dream and consciousness. Most photomontages demand a concentrated gymnastic of the eye and brain in order to speed up the visual digestion and immensely increase the range of associations.

Much more patently systematic than the photomontage, the photographic series is the logical culmination of reportage photography. In its naturalness and organic sequence, it is a simple form. The series is no longer a "picture," and none of the canons of pictorial esthetics can be applied to it. Here the separate picture as such loses its identity and becomes a detail of the assembly — an essential structural element of a larger whole.

Inspired thus by a definite purpose, a photographic series can be either a potent weapon or tender poesy. The prerequisite is the realization that a knowledge of photography is just as important as knowledge of the alphabet: that the illiterate of the future will be the person ignorant of the use of the camera and the pen alike.

Peculiarly, then, photography — created originally for exact recording of the immediate reality — can become and is becoming the tool of the fantastic, dreamy, super-real, and imaginary. The language of photography is necessarily becoming more complex as the photogram, superimposition, photomontage, mechanical or chemical distortion, and other devices are recognized as legitimate means of photographic expression. As the intellectual attitude changes, the photographer is becoming no longer exclusively interested in photogenic renderings; he tries to acquire not only a photogenic but a photocreative

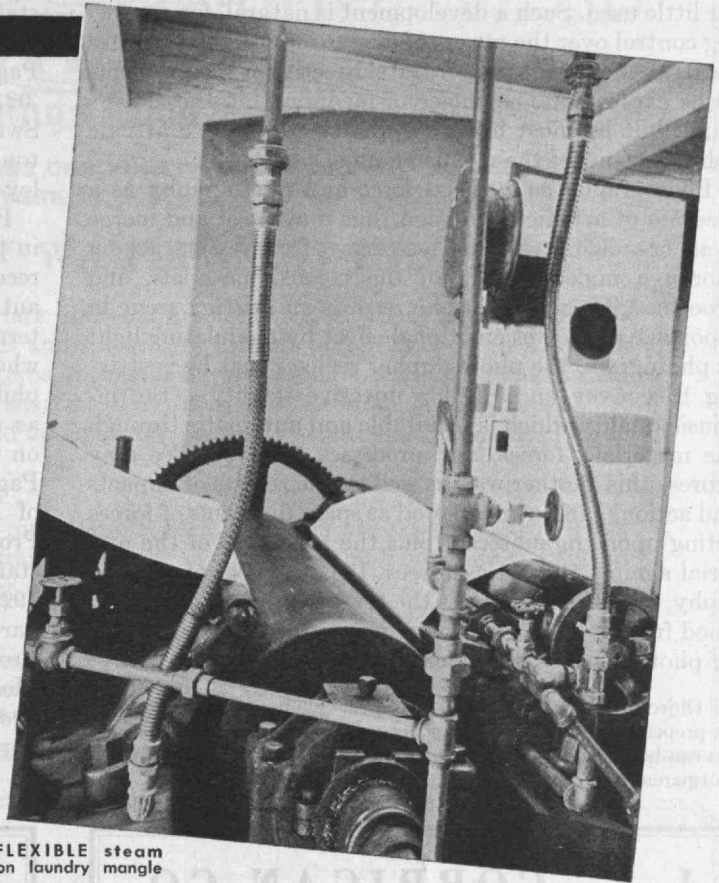
(Concluded on page 522)

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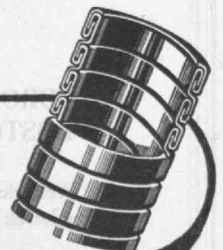
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ON ART AND THE PHOTOGRAPH

(Concluded from page 520)

mind. || He will not merely select what he finds, but he will produce situations which for him contain the necessary qualities for photographic expression with devices thus far little used. Such a development is natural, for a growing control over the means of expression usually liberates creative energies to concentrate directly on the problems to be expressed. The choice of medium is in the artist's hand, but he must have the ability to produce artistic coherence out of the means he uses.

Photography as a visual force and photography as a medium of artistic expression thus may meet and merge if an organizing will and necessity of expression act on thorough understanding of the means, materials, and processes. Then, whether he records an existing scene in reportage or creates emotional effect by modulating light in photogram, the photographer realizes that he is striving to convey an organic, objective quality — the intrinsic quality which is inevitable and automatic through the materials, forces, and processes involved. We may express this another way as well — the results of impacts and actions can be understood as space diagrams of forces acting upon the material, plus the resistance of the material against the acting forces. It is the goal of photography, whether it presents the textured face of a block of wood fresh from the saw or expresses terror, pity, or love by photomontage, to understand and impart this fact.

|| Objects, situations, persons, are called "photogenic" if they have the properties necessary for producing good photographs. These properties can be of the most diverse nature: roundness, richness in texture, transparency, mirroring surfaces, skeletal structure, and so on.

THE INSTITUTE GAZETTE

(Continued from page 502)

school year are the following long-time members of the staff: Professor Frank L. Hitchcock of Belmont, Professor Herman R. Kurrelmeyer of Waban, Professor Newell C. Page, '02, of Winchester, Professor Charles H. Porter, '02, of Cambridge, Professor Jesse J. Eames, '02, of Swampscott, Professor Lawrence S. Smith, '00, of Newton Highlands, Professor Theodore H. Taft, '01, of Wellesley Hills, and Charles M. Curl, '07, of Melrose.

Professor Hitchcock has been a member of the staff in the Department of Mathematics since 1910, when he received his doctor's degree from Harvard. He is the author of many papers on mathematical chemistry, quaternions, and vector analysis. Professor Kurrelmeyer, who received both his bachelor of arts and doctor of philosophy degrees from Johns Hopkins, will continue as lecturer in the Department of Modern Languages, on the staff of which he has served since 1902. Professor Page has been a member of the staff in the Department of Physics since his graduation from M.I.T. in 1902. Professor Porter, an alumnus of Brown and M.I.T. and staff member at the Institute from 1904 to 1909 and from 1927 to the present, will continue as lecturer in the Department of Business and Engineering Administration. Professors Eames, Smith, and Taft are members of the Mechanical Engineering faculty. Professor Smith and Professor Taft will continue as lecturers in the department during the next academic year. Charles M. Curl, who

(Continued on page 524)

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THE INSTITUTE GAZETTE

(Continued from page 522)

became an instructor in drawing in 1920, had taught at the Case School of Applied Science and at the University of Maine before joining the Institute staff.

To Office

ELECTED to Alumni Association offices for terms beginning on July 1, according to returns from the annual balloting recently completed are: A. Warren Norton, '21, President; Alf K. Berle, '27, Vice-president for two years; John A. Lunn, '17, and Henry A. Morss, Jr., '34, members of the Executive Committee for two years. Raymond Stevens, '17, Edward S. Farrow, '20, and H. W. McCurdy, '22, have been elected to term membership on the Institute Corporation for five years, and Ellis M. Brewster, '13, has been named to fill an unexpired term for four years. The contest for membership on the National Nominating Committee resulted in the naming of Charles A. Williams, '21, from District 3; Irving W. Wilson, '11, District 6; and Fred W. Morrill, '07, District 7.

For five-year terms as class representatives on the Alumni Council, the voters have chosen William P. Atwood, '76, Godfrey L. Cabot, '81, Arthur G. Robbins, '86, Salmon W. Wilder, '91, John A. Rockwell, '96, Theodore H. Taft, '01, Edward B. Rowe, '06, Orville B. Denison, '11, Henry B. Shepard, '16, Henry R. Kurth, '21, James R. Killian, Jr., '26, Gilbert M. Roddy, '31, Harry E. Essley, Jr., '36, and Johan M. Andersen, '41.

With the Council

HOLDING its 244th meeting on the last Monday in April in Walker, the Alumni Council had an attendance of 77 members and guests. At the start of the business session, President Raymond Stevens, '17, called on Dean H. E. Lobdell, '17, publisher of The Review, to introduce Beverly Dudley, '35, newly named Editor of the magazine, who spoke briefly, as did the retiring Editor, F. G. Fassett, Jr. Other matters in the business session included election of committee members as follows: *Assemblies*, John T. Rule, '21, chairman, Raymond F. Leonard, '27, and Robert G. Casselman, '39; *Audit and Budget*, Hugh S. Ferguson, '24, for three years; *Historical* (Concluded on page 526)

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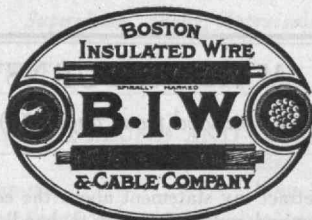
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THE INSTITUTE GAZETTE

(Concluded from page 524)

Collections, H. B. Richmond, '14, chairman for five years; *Honorary Members*, Philip K. Bates, '24, for three years; *Nominating Committee for Departmental Visiting Committees*, George A. Johnson, '23, and John A. Hrones, '34.

Resolutions in memory of Robert Hallowell Richards, '68, presented by Harry M. Goodwin, '90, chairman of a committee including Willard W. Dow, '01, and Burton G. Philbrick, '02, were accepted by a rising silent vote.

Charles E. Locke, '96, Alumni Secretary, reported for Henry B. Kane, '24, Director of the Alumni Fund, that the Fund had on March 31 exceeded its goal of \$150,000, and that the Fund for the sixth or current year, starting April 1, showed some increases over the comparable date last year. Various committee reports were presented, among them that of C. Yardley Chittick, '22, chairman of the Alumni Day banquet committee, who reported for Josiah D. Crosby, '21, chairman of Alumni Day 1945, that arrangements had been completed for the event. Mr. Chittick stressed that the banquet this year, in compliance with defense transportation regulations, will be entirely a local affair.

Kirk Drumheller, President of the Class of 1945, was then asked to introduce John J. Freiburger, '45, chairman of the Interfraternity Conference during the year past, who described for the Council some of the difficulties encountered in carrying on fraternity houses during the war emergency and explained wherein the Conference had succeeded or failed in meeting them. James R. Killian, Jr., '26, Executive Vice-president of the Institute, reported in some detail new plans for staff salary adjustments, discussing them as one aspect of the Institute's preparations for re-establishing normal operations as soon as possible after the war.

Principal speaker of the evening was John E. Burchard, '23, Director of Libraries and Director of the Albert Farwell Bemis Foundation, whose subject, the postwar

library plans of the Institute, was of broad scope and interest. Discussing the merits of central and branch-library systems, Professor Burchard analyzed the problem posed in the Institute by research and other needs, and sketched likely solutions. The prospect of library growth with the consequent question of storage facilities, he indicated, is being carefully considered in the development of plans for both the library system and the library building envisioned for Technology. The new library will respond to the trend toward bringing teaching into the library itself and will provide proper facilities for ample development of the Institute's program in the humanities. Professor Burchard stressed the importance of critical librarianship in its relation to the ever increasing mass of research material and made plain that the new library will make provision for the utilization of instrumentalities other than books, such as film and radio, for the fuller cultural development of student life.

MAIL RETURNS

(Concluded from page 476)

and I willingly retract my statement about the complexity and high cost of telephones and radios designed to handle the unduly high-pitched Lilliputian conversations.

His point about Lilliputian vision, however, is not so clear-cut, although I admit that I may have oversimplified the subject. Even if certain birds do have sharper vision than humans (and I would be interested in hearing how that fact has been established), it does not follow that this is the result of their smaller size. The sharper pictures obtained with smaller iris openings on a camera can be explained by the consequent reduction in depth of focus and, more significantly, by the fact that all rays of light transmitted pass proportionately closer to the center of the lens. The same effect would not be observed if the lens were always reduced in the same proportion as the aperture stop.

The universal reduction in Lilliputian wave lengths that Mr. Lush proposes would require that the velocity of sound as well as of electromagnetic radiation be drastically reduced. This would violate one of the major premises upon which all my analysis was based — that the laws of physics are the same in Lilliput as everywhere else. Any other assumption would make such a study virtually pointless.

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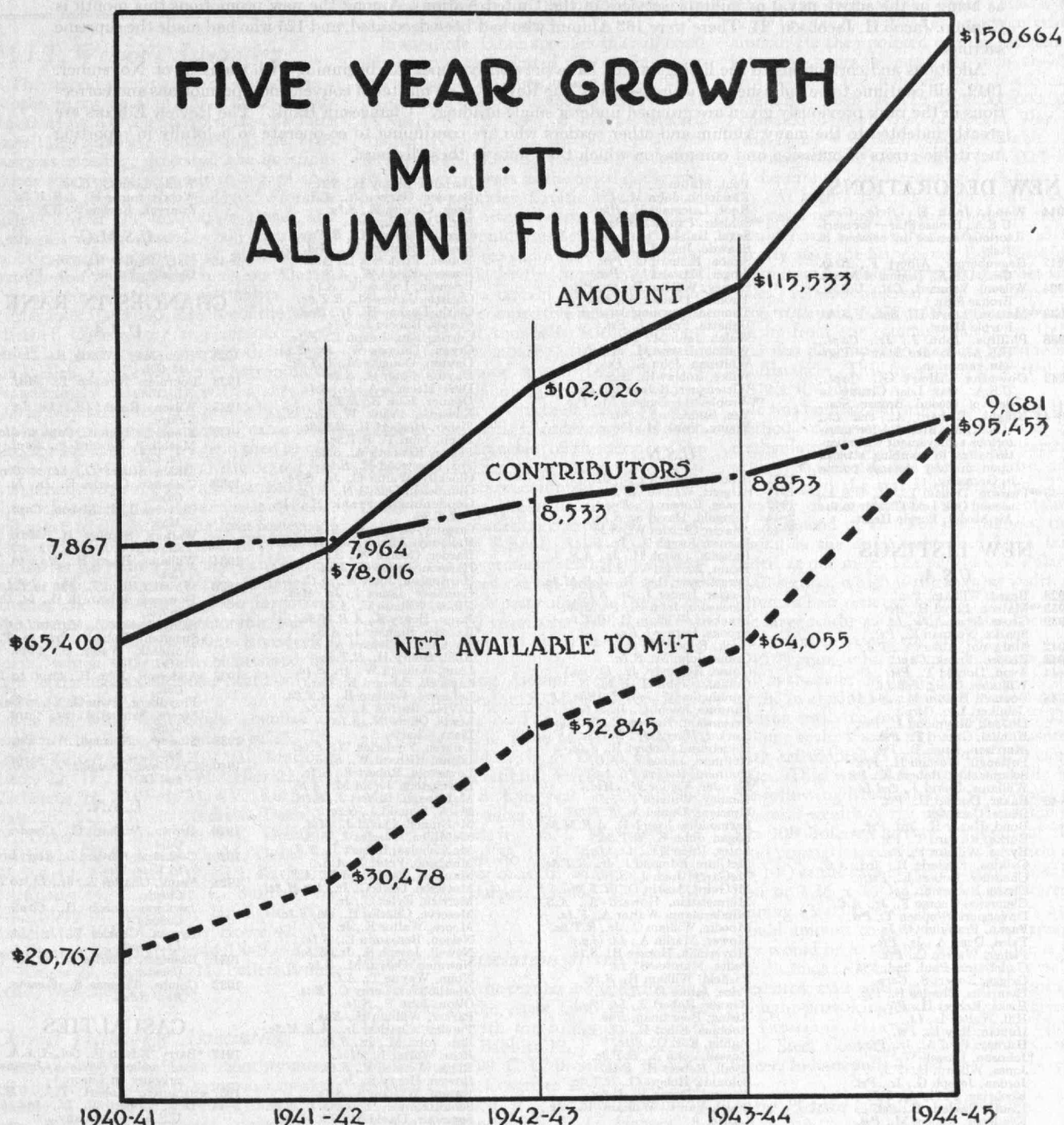
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TECHNOLOGY MEN IN ACTION

THE ALUMNI FUND — ITS PROBLEMS AND GROWTH



The growth of our Alumni Fund was tabulated in the Fifth Annual Report. Graphically represented, however, one important fact becomes more readily apparent, namely the increased amount available as a gift to M.I.T. as the total rises. Expenses (Review subscriptions, Association, Fund) are relatively fixed sums. Thus during our first year 68 per cent of the total went for expenses, only 32 per cent to M.I.T. During our fifth year, however, expenses accounted for only 37 per cent of the total, and 63 per cent went to M.I.T. The totals increased two and a half times, but Technology benefited by a sum four and a half times greater.

TECHNOLOGY MEN IN ACTION

M.I.T. MEN AT WAR

Up to May 1 over 8,302 Institute Alumni, including 33 Admirals, 6 Commodores, and 91 Generals, were recorded as being in the active naval or military services of the United Nations. Among the new promotions this month is Commo. Jacob H. Jacobson '24. There were 163 Alumni who had been decorated, and 125 who had made the supreme sacrifice.

Additions and corrections to the listings which have previously appeared, beginning with the issue of November, 1942, will continue to be published in future issues of The Review. As a matter of convenience, promotions and corrections in the rank previously given are grouped under a single heading, "Changes in Rank." The Review Editors are greatly indebted to the many Alumni and other readers who are continuing to co-operate so helpfully in reporting inevitable errors of omission and commission which they note in these listings.

NEW DECORATIONS

- 1914 Wood, John E., *Brig. Gen.*, U.S.A., Bronze Star—for meritorious service in combat in Italy.
- 1917 Hegenberger, Albert F., *Brig. Gen.*, U.S.A., Legion of Merit.
- 1924 Wilson, Vennard, *Col.*, U.S.A., Bronze Star.
- 1933**Matson, Lloyd H., *Sgt.*, U.S.A., Purple Heart.
- 1938 Phillips, John J., Jr., *Capt.*, U.S.A., Bronze Star—Papuan campaign.
- 1942 Downing, Albert G., *Capt.*, U.S.A., Oak Leaf Cluster in lieu of second Bronze Star.
- 10-44 Knight, Richard A., *2nd Lt.*, U.S.A., Air Medal—for meritorious achievement while participating in bombing attacks upon military defense points in Germany.
- 6-45**Pearson, Donald L., *Lt.*, U.S.A., second Oak Leaf Cluster to the Air Medal; Purple Heart.

NEW LISTINGS

U.S.A.

- 1928 Beard, William, *Pvt.*
- 1933**Matson, Lloyd H., *Sgt.*
- 1939 Gross, Jerome, *1st Lt.*
- 1942 Sparks, Norman E., *Pvt.*
- 1943 Margenot, Albert V., *T.5.*
- 2-44 Record, Frank, *Capt.*
- 2-44 Axon, Donald T., *Pvt.*
- Williams, Craig, *2nd Lt.*
- 6-45 Beumer, Halton M., *2nd Lt.*
- Celniker, Leo, *Corp.*
- DuJack, Raymond L., *Pvt.*
- Kunkel, Gerard F., *Pvt.*
- Morrison, Hugh B., *Pvt.*
- Pettengill, Gordon H., *Pfc.*
- Schumacher, Robert K., *Pvt.*
- Williams, David J., *2nd Lt.*
- 2-46 Baker, Donald H., *Pvt.*
- Blake, Carl, *Sgt.*
- Bond, Harry H., *3rd Pvt.*
- Burke, Richard T., *Pvt.*
- Byrne, William F., *Pvt.*
- Calkins, Frederic R., *3rd, A.C.*
- Chandler, Robert E., *Pvt.*
- Chase, Robert E., *Sgt.*
- Clements, George F., Jr., *A.C.*
- Davenport, Stephen J., *Pvt.*
- Fagan, Franklin G., Jr., *Pvt.*
- Fales, Dean A., Jr., *Pfc.*
- Fisher, Warren C., *Pfc.*
- Gadebusch, Paul, *2nd, Pvt.*
- Griggs, Robert S., *Corp.*
- Heinrichs, Charles E., *Pfc.*
- Hicks, Robert H., *Pfc.*
- Hill, Walter L., *Lt.*
- Homan, Ray L., *Pvt.*
- Hurney, Paul A., Jr., *Pfc.*
- Johnson, Russell W., *Pvt.*
- Johnson, Russell W., *T.5.*
- Jordan, Joseph G., Jr., *Pvt.*
- Koehring, Philip A., *T.5.*
- Kraft, Frederic B., *Pvt.*
- Krudener, Robert M., *Pvt.*
- McCowan, Frank M., Jr., *Pvt.*
- **Markell, Myron, *Pfc.*
- Melchoir, Charles M.
- Melstone, Gordon K., *Pfc.*
- Miller, John C.
- Moore, David C., *Pvt.*
- Murdoch, John T., *Pvt.*
- Murphy, Ralph F., *Pvt.*
- Murray, Russell, *2nd, A.C.*
- Newton, Leonard F.
- Noce, Robert W., *Cadet*
- Obes, Warren C., *Pfc.*
- O'Donnell, Robert J., *Pvt.*
- Oleson, Gunnar M., Jr., *Pvt.*
- Pappalardo, Salvatore J., *Pvt.*
- Patterson, Chester M., Jr., *Pvt.*
- Perkins, Wesley A.
- Peterson, Robert C., *Pvt.*

* Killed in Action

- Pohl, Milton S., *Pvt.*
- Randolph, John M., *Pvt.*
- Root, Lawrence E., *Pfc.*
- **Schlehr, Paul R., *S.Sgt.*
- Segal, Ralph, *Pvt.*
- Shawde, John T., *2nd Lt.*
- Simon, Richard C., *Pvt.*
- Singer, Edward M., *Pvt.*
- Stoney, William E., Jr., *Pvt.*
- Thomas, Donald W., *Pvt.*
- Thomas, Downing A., *Pvt.*
- Ughetta, Frank J., *Pvt.*
- Walch, John M., *Pvt.*
- Walton, Harry M., Jr., *Pvt.*
- Whitman, John E., *Pvt.*
- Wilke, Robert R., *A.S.*
- **Wittenauer, Robert H., *Pvt.*
- **Wroblewski, Eugene M., *Pfc.*
- Yee, Kenneth F., *Pvt.*
- Young, Frank M., *Corp.*

U.S.N.

- 1931 Brooks, Frederick E., Jr., *Lt.*
- 1941 Sargent, Warren G., *Lt.(j.g.)*
- 1942 Evans, Robert C., *Ens.*
- 2-44 Feingold, David S., *Sic.*
- 6-45 Adams, Charles W., *Sic.*
- Barnes, Joseph A., Jr., *Sic.*
- Batsche, Joseph H., Jr., *A.S.*
- Baum, Richard V., *Sic.*
- Bergstresser, Lee R., *A.R.M.3c.*
- Biegler, Lester J., Jr., *Sic.*
- Blockson, John H., *Ph.M.2c.*
- Brackett, William R., *R.T.1c.*
- Brooks, Bernard, *Ens.*
- Cook, Robert B., *Sic.*
- Crane, Kenneth, Jr., *Lt.(j.g.)*
- Cullinan, John H., *Sic.*
- Cunningham, Leroy S., *Ens.*
- Fantone, Joseph C., Jr., *Sic.*
- Greenwald, Robert C., Jr., *A.S.*
- Harker, Harry, Jr., *R.T.3c.*
- Hildebrand, Robert B., *Sic.*
- Hoffman, James E., *A.C.*
- Hoffman, Robert F., *A.S.*
- Kavaler, Vigdor W., *Mid.*
- Kenney, William J., *Sic.*
- Lanciani, Daniel A., *R.T.3c.*
- Laumondra, Joseph R., *A.R.M.3c.*
- Logan, John K., *R.T.3c.*
- Lutes, Russell E., *Lt.(j.g.)*
- McClure, Edmond J., Jr., *R.T.3c.*
- McGarry, John J., *Sic.*
- McGuire, Austin D., *R.T.3c.*
- Mermelstein, Howard A., *A.S.*
- Mindermann, Walter A., *F.1c.*
- Moodie, William C., Jr., *R.T.2c.*
- Mower, Marlin A., *Lt.(j.g.)*
- Moyerman, Horace B., *Sic.*
- Palles, Maurice S., *Lt.*
- Pasfield, William H., *Sic.*
- Pice, James D., *R.T.3c.*
- Renner, Robert J., *Lt.(j.g.)*
- Rising, Boardman, *Ens.*
- Robbins, Elliot R., *Lt.(j.g.)*
- Ruhlig, Earl O., *Sic.*
- Russell, John A., *R.T.3c.*
- Ryall, Robert H., *Ens.*
- Schmidt, Robert G., *R.T.3c.*
- Shearer, Joseph B., *F.3c.*
- Smith-Vaniz, William R., Jr., *Sic.*
- Snow, Richard A., *Sic.*
- Sullivan, Edmund J., Jr., *Sic.*
- Summers, Oscar D., *Ens.*
- Veeneman, William H., Jr., *Lt.(j.g.)*
- Wallstein, Robert A., *Sic.*
- Weaver, Ronald S., *Lt.(j.g.)*
- Winschel, James F., *Ens.*
- Winsor, Paul, *3rd, Sic.*
- Winter, Raymond C., *Lt. Comdr.*
- Witworth, Otis R., *Ens.*
- Wood, James W., *R.T.3c.*
- 2-46 Allen, Joe D., *Sic.*
- Antul, John J., *R.T.3c.*
- Arshal, George, *A.C.*
- Ashton, Donald, *R.T.3c.*
- Aylward, William R., Jr., *Sic.*
- Baer, Henry C., Jr., *Sic.*

* Missing in Action

† Prisoner of War

- Barnum, LeRoy H., *Sic.*
- Bawden, Garvin, Jr., *A.S.*
- Beck, Charles E., *Sic.*
- Bent, John E., *Coz.*
- Bigelow, Robert O., *R.T.2c.*
- Bledsoe, Richard W., *Mid.*
- Bohlen, Frederick L., *A.C.*
- Bowers, Raold W., *A.S.*
- Brigham, Kenneth W., *Sic.*
- Christie, James M., *R.T.3c.*
- Clark, Eugene H., Jr., *Ens.*
- Coates, Robert J., *Sic.*
- Corringham, Joseph E., *F.1c.*
- Cryan, Thomas W., Jr., *Sic.*
- Dayton, Douglas M., *R.T.3c.*
- Dayton, Peter G., *Sic.*
- Diek, Herman A., Jr., *Sic.*
- Donner, John B., *R.T.3c.*
- Edwards, Frank W., Jr., *Sic.*
- Fisher, Herbert H., *R.T.3c.*
- Fitch, John T., *R.T.3c.*
- Foster, Kenneth A., *Sic.*
- Fox, Sherwood N., *Sic.*
- Glockler, Walter C., Jr., *Sic.*
- Glumlich, Daniel N., *Sic.*
- Goodenough, Frank H., Jr., *R.T.3c.*
- Gregory, Arthur R., *H.A.1c.*
- Halladay, John F., Jr., *R.T.2c.*
- Harder, George W., *Sic.*
- Harmon, Bruce C., *Mid.*
- Harrington, John W., *A.C.*
- Hennessy, James J., Jr., *Mid.*
- Hibbs, William F., *A.C.*
- Jaran, Henry S., *A.R.M.3c.*
- *Katcher, Stanley J., *A.S.*
- Kavanagh, Richard A., *Sic.*
- Kohl, Henry H., *R.T.2c.*
- Lang, William W., Jr., *Sic.*
- Laycock, Edward E., *Coz.*
- LeLievre, William B., *R.T.3c.*
- LeVine, Burton A., *R.T.3c.*
- Lewis, Oliver N., *Sic.*
- Licht, Charles A.
- Loifgren, Frederick W., *Sic.*
- Logan, Richard W., *Sic.*
- Lovezola, Robert F., *Sic.*
- Lowenstein, Jerold M., *A.S.*
- McDonagh, Robert J., *Sic.*
- Mack, Donald J., *Sic.*
- McKinell, David J., *Mid.*
- McMillen, Charles J., *A.S.*
- McNicholas, Robert J., *A.S.*
- Mangano, Peter J., *A.S.*
- Manning, Ferdinand L., *A.S.*
- Matteson, Lewis C., Jr., *Aer.M.3c.*
- Merrick, Eyles C., Jr., *Sic.*
- Meserve, Charles H., Jr., *Sic.*
- Moore, Walter E., Jr.
- Nelson, Benjamin E., *Sic.*
- Newell, Joseph S., Jr., *Sic.*
- Newman, Calvin M., *Sic.*
- Nolin, Wayne T., *A.C.*
- Oberholtzer, Leroy C., *Ens.*
- Olson, John P., *Sic.*
- Parker, William H., *Ens.*
- Pursley, Charles, Jr., *A.E.M.3c.*
- Rau, John M., Jr., *Sic.*
- Rees, Walter L., *Mid.*
- Riggs, Wendell P., *Sic.*
- Rowen, Henry S., Jr.
- Rumpf, William S., *Sic.*
- Schlottmeyer, Thomas J., *Sic.*
- Seymour, David M., *Ph.M.2c.*
- Siegmund, Robert L., *Sic.*
- Sipe, Donald J., *S.M.3c.*
- Sizelove, Donald E., *Ens.*
- Stickney, Charles W., *T.M.3c.*
- Sutton, Carroll T., *Ph.M.2c.*
- Tatro, Paul A., *Ens.*
- Theodosopoulos, James, *Sic.*
- Thielsens, Wagner P., Jr., *A.S.*
- Tiffany, Daniel N., Jr., *Sic.*
- Tisdale, Robert E., *A.C.*
- Tolson, George F., Jr., *Mid.*
- Towill, Edward T., Jr., *S.M.3c.*
- Uretsky, Jack L.
- VanDerMeid, Thomas A., *A.C.*
- Wadman, Robert B., *A.R.T.3c.*
- Walker, James R.
- Weinberg, Leonard D., *A.S.*
- Wesson, Robert L., *Sic.*

* Died or Killed in Service

- Wilde, Leon G., *Sic.*
- Woods, James E., *A.R.M.3c.*
- Zwaryck, Eugene J., *Sic.*

U.S.M.C.

- 2-46 Daly, Radley H., *Corp.*
- Oglesby, Ensley O., Jr., *Pvt.*

CHANGES IN RANK

U.S.A.

- 1921 Humphrey, Watts S., *Lt. Col.*
- to Col.
- 1928 Fournier, Norman L., *Maj. to Lt. Col.*
- 1931 Wilson, Robert K., *1st Lt. to Capt.*
- 1932 Finnerty, John A., *Capt. to Maj.*
- Mechling, Edward P., *Capt. to Lt. Col.*
- 1933 Miller, Stuart D., *Lt. to Capt.*
- Cashman, Charles E., Jr., *Lt. to Capt.*
- Culverwell, J. Mason, *Capt. to Maj.*
- Walters, Stanley H., *Maj. to Lt. Col.*
- 1934 Williams, Roger H., *Maj. to Lt. Col.*
- 1936 Whittier, Paul E., *Pvt. to T.4.*
- 1937 Downing, Ellsworth B., *Lt. Col. to Col.*
- Salny, Jerome E., *Maj. to Lt. Col.*
- *Strauten, Robert, *Pvt. to T.5.*
- Wojczak, Walter S., *Capt. to Maj.*
- 1938 Anderson, John H., *Capt. to Lt. Col.*
- Freydberg, Irwin G., *Lt. to Capt.*
- Steele, Samuel A., Jr., *Capt. to Maj.*
- 1938 Stewart, Norman W., *Pvt. to Sgt.*
- 1940 Crawford, Douglas W., *O.C. to 2nd Lt.*

U.S.N.

- 1916 Brown, Willard C., *Comdr. to Capt.*
- 1920 Cochran, Edward L., *Rear Adm. to Vice Adm.*
- 1924 Frank, Charles A., Jr., *Lt. to Lt. Comdr.*
- Jacobson, Jacob H., *Capt. to Commo.*
- Lyman, Charles F., Jr., *Lt. to Lt. Comdr.*
- 1931 Basinger, Charles B., *Lt. to Lt. Comdr.*
- 1932 Combs, Thomas S., *Commo. to Rear Adm.*

CASUALTIES

- 1917 *Barry, Edwin F., *Col.*, U.S.A. — of malaria while a Japanese prisoner on Luzon.
- 1937 *Strauten, Robert, *T.5.*, U.S.A.
- 2-44**Dew, Robert J., Jr., *2nd Lt.*, U.S.A. — Germany.
- *Nelson, Paul G., *2nd Lt.*, U.S.A. — Belgium.
- 10-44 *Hyde, William B., *2nd Lt.*, U.S.A.
- *Nightingale, William E., *R.C.A.F.* — over Germany.
- 6-45**Schneider, Frederick R., *Pfc.*, U.S.A. — France.
- *Skinner, Charles V., *Pvt.*, U.S.A. — Germany.
- 2-46 †Fagan, Franklin G., Jr., *U.S.A.*
- †Johnson, Russell W., *U.S.A.* — France.
- *Katcher, Stanley J., *A.S.*, U.S.N.
- **Markell, Myron, *Pfc.*, U.S.A. — Germany.
- **Schlehr, Paul R., *S.Sgt.*, U.S.A.
- **Wroblewski, Eugene M., *Pfc.*, U.S.A. — Germany.

** Wounded

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

M.I.T. Women's Association

The second meeting of the season was a supper party held in the Emma Rogers Room at six o'clock on April 12. Charlotte Sage '13, President, conducting the brief business meeting, described the questionnaires soon to be sent out in regard to a dormitory for women students. Florence Stiles '22 read the final draft aloud, and some discussion ensued upon this long moot question as well as on plans for the Association's annual luncheon on Alumni Day and for other future assemblies.

Margaret Harwood, director of the Maria Mitchell Observatory at Nantucket, provided an exceptionally entertaining evening with a talk on her "Astronomical Wanderings." Beginning with a sketch of Maria Mitchell's life and proceeding to an explanation of how she herself came to be director at Nantucket in a field then so rare for women, Miss Harwood illustrated her wanderings with slides which ranged from Nantucket west to California, east to Paris, and south to the interesting Inca regions of Peru, and wound up with the tale of a Spanish dinner party told in a dry Yankee vein which reduced many of her audience to stitches and will not be soon forgotten. The evening was also memorable for the news of the late President Roosevelt's death, which some knew beforehand but kept to themselves and some heard only on coming out.

The following Technology Alumnae attended: Charlotte Simonds Sage '13, IX, Louise Peirce Horwood '19, VII, Marjorie Pierce '22, IV, Florence W. Stiles '22, IV, Katherine H. DeWolf '25, IV, Ruth M. Hale '26, XV, Ruth Andrew Dean '29, IV, Grace G. Farrell '29, VII, Theodora Keith '32, IX-A, Elizabeth M. Dolan '34, IV, Pearl J. Rubenstein '38, VIII, Katherine B. Adams '44, IV, Julia C. Sullivan '42, VII, Mary E. Elder '43, II, Egilda DeAmicis '44, VII, Alice M. Howe '42, IV, and Eleanor Dean Patrick '44, IX-B.—RUTH A. DEAN '29, *Secretary*, 11 Fuller Brook Road, Wellesley 81, Mass.

Detroit Technology Association

On April 10 we held our monthly meeting and were fortunate to secure as a speaker Stanley M. Udale '06. He took for his subject, "War and the Engineer," covering the influence of the engineer on the war program over a period running from about 1901 to the present. During the war years Mr. Udale has been associated with both the British and American governments on war projects. He spoke, therefore, from a considerable background of knowledge and experience. He believes that engineers in general have not been given proper recognition for their accomplishments, either in or out of the armed services. He presented, in

addition, a solution for developing properly trained engineers for the various branches of the service in future.

In sum, Mr. Udale specifies that all commissions in the United States Engineers and in the Naval Construction Corps should be given to men selected as follows: At 15 years of age, boys would be selected competitively by examination on an intellectual and physical basis as apprentices to serve seven years in the naval dockyards and in the armories. Existing facilities and machine tools owned by the Defense Plant Corporation would thus be made available. For the first three and a half years, the apprentices would live at home. At the end of that time, a certain percentage would be selected by competitive examination for West Point and Annapolis. Selected apprentices, after six months at West Point or Annapolis, would go to Technology or similar schools for four years, spending their vacation with their class at West Point or Annapolis in order to orient them to the other branches of the service. The others would then go to military and naval establishments and complete their apprenticeship and at the same time acquire a high school education comparable to that of Ford Trade School. After their seven years in the government service the apprentices would serve seven years as enlisted men (sergeants or petty officers). The officers would serve 10 years after graduation. All would be subject to recall in the event of war.

The following Alumni were in attendance at the meeting: S. M. Udale '06, M. S. Dennett '11, F. N. Phelps '13, C. F. Harrington '16, T. K. Hine '16, C. T. Ellis '17, A. C. Litchfield '17, E. F. Doten '19, H. F. Brennan '23, Franklin Fricker '25, D. B. Martin '25, J. E. Longyear '26, D. M. Sutter '26, J. G. Brunner '34, T. F. Morrow '35, A. H. Copeland, Jr., '38, L. M. Gerson '38, E. W. Lovering '38, R. J. Meier '41, E. W. Upton '43.—DOUGLAS B. MARTIN '25, *Secretary*, 6501 Harper Avenue, Detroit 31, Mich.

Indiana Association of the M.I.T.

On April 11 the regular monthly meeting was held at the Apex Grill at 129 East 16th Street, with the following members present: J. H. Babbitt '17, F. C. Balke '14, W. W. Bonns '99, C. L. Bouchard '36, S. C. Boyle '27, J. M. Cosgrove '22, J. J. Demo '35, A. B. Ellenwood, Jr., '34, Russell Fanning '30, A. I. Franklin '98, T. G. Harvey '28, H. C. Karcher '25, C. L. Kennedy '42, M. D. McCuen '40, E. M. McNally '18, J. J. Monagle '35, E. G. Roberts '32, A. C. Rood '21, and J. L. Wayne, 3d, '96.

The speaker, Robert J. Kryter, was introduced by J. Lloyd Wayne, 3d. Mr. Kryter was graduated from Purdue in 1923 in chemical engineering. At present he is sales manager for the Esterline-Angus Company, makers of electrical instruments. The title of the talk was "Unraveling the

Infinite." Mr. Kryter stated that civilized man differs from all the other animals of earth in that he is a counting, calculating animal. He then pointed out the difference between countable numbers, such as 100 or 1,000,000 and numbers which are not countable, such as the \$400,000,000,000 estimated over-all cost of World War I. This figure was made understandable by assuming that it was counted in \$100-bills at the rate of one a second for 24 hours a day. At such a rate, this sum would take 127 years to count or, to be finished now, would have to have been begun in 1818, shortly after the Napoleonic Era. Working down from our common units of inches and miles, it was necessary to develop the Angstrom unit, 3.937×10^{-9} inches. Working up from our common units, the light year was developed to measure astronomical distances. This figure can be stated as 5.879×10^{12} miles.

It was pointed out that in astronomy the method of measuring distances was by triangulation. The long axis of the earth's orbit (186,000 miles) is used as a base, and the angle to the star then measured. The parallax of the nearest star, Alpha Centauri, is .76 second of arc. For comparison, one second is the angle subtended by a lead pencil at one mile. The parallax of Polaris is .01 second, which is the angular width of a human hair seen at one mile. Going from the large to the small, Mr. Kryter then explained the weight of an electron as 9×10^{-28} gram, which is to a 2.2-gram steel ball as that steel ball is to the weight of the earth. In closing, the speaker made a comparison really to end all comparisons. The volume of the known universe (as measured with telescopes) is estimated at 10^{68} cubic miles. This was made comprehensible by the following illustration: Checks equal to the total wealth of the world (3 trillion or 3×10^{12} dollars) written by each of the total population of the world (2 billion or 2×10^9) at the rate of one a second (31 million or 3.16×10^7) since our sun started shining (5 trillion or 5×10^{12} years ago would amount to 10^{42} dollars. This quantity would be to the 10^{68} figure as one is to the distance to Polaris in inches! This well-presented talk was unique, entertaining, thought-provoking, and very well received.—THOMAS G. HARVEY '28, *Secretary*, Monarch Steel Company, 545 West McCarty Street, Indianapolis 7, Ind.

New Haven County Technology Club

C. Alvin Moeller '33, senior engineering test pilot of the Sikorsky Aircraft division of United Aircraft Corporation, addressed 32 members and guests of the Club at the Hotel Duncan on April 24. His fascinating story of the past, present, and future of "Infuriated Palm Trees"—helicopters—and a very interesting color film illustrating their capabilities led to a lengthy question-and-answer period, which President

Blank '37 finally terminated because of the late hour. Although Moeller would accept no orders for postwar deliveries, many of the group wanted detailed flying instructions and will probably measure and grade the back lot this week end. If you can get him, Moeller will inspire any group.

Polleys '18, Wellington '16, and Weeks '24 were appointed as the nominating committee for 1945-1946. Members present were G. V. Maconi '15, M. S. Wellington '16, H. N. Solakian '17, H. H. Mardoian '19, Ettore Ciampolini '20, J. L. Hetzel '23, W. R. Weeks '24, L. B. Grew '27, F. W. Buck '29, A. C. England '30, Samuel Jacobson '31, A. M. Plant '31, F. M. Green '32, J. P. Ivaska '32, D. S. Britton '33, C. E. Fulkerson '33, C. A. Moeller '33, A. I. Blank '37, T. S. Merriman '39, and H. R. Polleys '18 with guests: K. A. Griffiths, R. J. Hurley, E. Kusterer, A. Latimer, R. E. Montgomery, O. Pelliccia, R. T. Roberts, F. G. Stroke '40, T. Talley, J. W. Upson, and C. S. Williams. — LAWRENCE B. GREW '27, *Secretary*, Southern New England Telephone Company, New Haven, Conn.

Technology Club of Philadelphia

The executive committee dinner meeting of April 17 at the Warwick Hotel left little doubt that our active nucleus, the core of any club, is growing in numbers and activity. It has become the policy here in Philadelphia to hold meetings of officers and committeemen at intervals between our regular meetings in order to perfect all plans for the larger meetings and to develop future policy. Under the leadership of our energetic President, Herbert W. Anderson '15, we have set up a membership goal of 200 enthusiastic men; and in order to achieve it, we must give our prospective new club members outstanding programs with a real opportunity for evenings of good fellowship.

Three regular meetings a year have been scheduled for the third weeks in May, October, and January. On Tuesday, May 15, at the University Club we shall have the pleasure of hearing Henry E. Rossell '15, President of the Cramp Shipbuilding Company, former Professor of Naval Construction at Technology, and Ralph T. Jope '28, Business Manager of The Review. Before the memory of this meeting begins to fade, we have another double-header for Philadelphia on the evening of Tuesday, October 16, at the University Club: Professor Francis O. Schmitt, of the Department of Biology and Biological Engineering at the Institute, and Professor Charles E. Locke, Secretary of the Alumni Association. We hope that the Philadelphia Alumni and any Tech men in the city at that time will join us, beginning with the punch bowl prior to these occasions. Bill MacCallum '24, has contracted for the rental of an excellent public address system for the May and subsequent scheduled meetings.

Edward J. Healy '23, Past President, was appointed as your delegate to the Alumni Council meetings in Cambridge. We were privileged to hear from Francis J. Chesterman '05, life member of the Corporation, who emphasized that Cambridge welcomes all possible co-operation in Alumni affairs from local associations.

Robert E. Worden '36, chairman of our placement planning and guidance committee, told us of his visit in Cambridge with Raymond H. Blanchard '17, national chairman of the Postwar Placement Committee, with Nathaniel Sage '13, director of the Division of Industrial Cooperation, and with Professor Paul Pigors, of the Economics Department, all of M.I.T. Professor Pigors has been appointed secretary of the committee. The central committee is carefully planning procedure to help returning veterans, and Bob posed a question to the membership: Does Philadelphia want to set up a committee as soon as possible, or should we wait for the completed plans of the national committee? Our committee members favored immediate action in setting up a small executive committee to develop an effective policy. In Philadelphia, we have processed our first case, and undoubtedly many more will develop after victory in Europe is secure. Discussion ensued as to what form our organization should take: Should our plan make use of a full-time man, or should volunteers compose it? In our group the volunteer plan was favored because it was felt that we could not afford the salary of a man of the necessary caliber. As an alternative, our Club believes that a semipermanent committee could be formed which would include experts in the various engineering fields, these men possessing a cross-sectional knowledge of the companies in this area. Around such men could be organized a less active committee of men who would interview the applicants on a round-robin basis particularly in their own spheres of activity.

The following men attended the meeting: Herbert W. Anderson '15, Walter J. Beadle '17, Harold Boericke, Jr., '44, Francis J. Chesterman '05, Wendell N. Currier '31, Clarence W. Farr '33, Edwin M. Goldsmith, Jr., '23, Hugo H. Hanson '12, Robert M. Harbeck '28, Edward J. Healy '23, Henry W. Jones '26, Howard C. Lawrence, Jr., '38, George T. Logan '29, William H. MacCallum '24, Samuel K. McCauley '41, Edwardes S. Petze '28, René A. Pouchain '17, Oden B. Pyle, Jr., '16, Charles W. Stose '22, William H. Wannamaker, Jr., '30, Robert W. Weeks '13, Charles B. Weiler '25, Edmund A. Whiting '15, George E. Whitwell '15, Robert E. Worden '36.

Mark your calendars for the next meeting at 6:30 p.m. on Tuesday, May 15, at the University Club. Visiting Alumni who seek information can get it by telephoning JEFFerson 0642. — EDWARDES S. PETZE '28, *Secretary*, Scott Paper Company, Foot of Market Street, Chester Pa. *Assistant Secretaries*: HAROLD BOERICKE, JR., '44, 5932 Overbrook Avenue, Philadelphia, Pa.; ROBERT M. HARBECK '28, Fidelity Machine Company, Philadelphia, Pa.

M.I.T. Club of Western Pennsylvania

Since the beginning of the year members of this local Club have held two buffet dinner meetings at the University Club in Pittsburgh, the usual meeting place. At the first of these on January 30, Joseph Cox '23, President, announced that a committee on postwar placement had been selected, with the following men appointed to serve: Harold Lang '09, chairman, Ralph

Ferry '12, Elmer Holbrook '04, George Ousler '16, Warren Smith '27, Thomas Spooner '09, Reginald Wakeman '26, Clyde Whetzel '17, and Bradford Young '26. The next item for discussion concerned the newly proposed constitution and bylaws, a copy of which had been distributed to each member prior to this gathering in order that comments might be secured and the subject discussed. The committee organized for this task and directed by Raymond Lafean '19 had evolved such a thorough document that the only important item of discussion dealt with choice of a name for the Club. It was the consensus of opinion that the present comprehensive name would be more suitable than the M.I.T. Club of Pittsburgh, with its limited scope. It was suggested, however, that the final decision be deferred until the annual meeting in May in order that members might submit additional remarks from which a final transcript could be prepared. For the non-business portion of the evening Paul B. Davidson of the Mellon Institute presented a most informative talk on the "Pictures in Paper," thus indicating watermarks, which were viewed by means of transmitted light.

The second meeting of the new year, on March 20, proved to be a most enjoyable one for the Alumni of this district because many questions in our minds regarding the role of Technology in the return to peacetime activity were adeptly answered by B. A. Thresher '20, Associate Professor of Economics and Director of Admissions, in his instructive talk on "Wartime Trends and Postwar Prospects." The intense interest shown in the question period which followed was ample proof of an absorbing evening. On this occasion also President Cox announced that Charles Boardman '25 had been appointed second Honorary Secretary representing M.I.T. in this district to replace Elbridge Casselman '15, who had recently been transferred to Connecticut. Read at this time was a letter of appreciation from Professor Emeritus Dugald C. Jackson for the resolutions concerning greetings and salutations sent him by the Club at the time of his 80th birthday celebration at the Engineers Club in Boston. — STANLEY C. JOHNSON '39, *Secretary*, 47-B Woodland Terrace, Clairton, Pa.

Washington Society of the M.I.T.

The Society's April meeting on the 12th was held amid the consciousness of our rapidly changing times. Only 10 minutes before the meeting news of the President's death had been made public. Of the members assembling, some had heard and others were incredulous when they were told. Conversation followed lines that have since become national: first, of unbelief at the news itself; then, of the nation's great need for the President in these particular months; and, third, of the tremendous task facing the new President, whose personality and attainments are so different from those of Mr. Roosevelt. The meeting opened with a period of reverent silence as a tribute to the late President.

It is good to note that our repeated invitations to all Washington Alumni, and, in fact, to every Alumnus, to meet with us on the second Thursday at the Young Women's Christian Association have received recognition. We are eager to have you come.

These meetings are always dinner meetings, always at 6:00 P.M., and always well attended. We know you will have fun if you can make the date. We cannot be sure that our fall meetings will be on Thursdays; but when you are in town, please get in touch with the Y. W. and find out the meeting night because we shall try to keep that as our meeting place.

It is not often that we have the intimate sort of meeting that we had on the 12th. Bill MacMahon's brother, Frank K. MacMahon '33, a lieutenant colonel in the Army Air Forces, was one of the principal speakers. Those of you who know Bill will be glad to know that his brother has made an outstanding record in the training of parachute troops which have been used in every invasion made by the American forces. Colonel MacMahon looks very like Bill and has much of his personality as he speaks, and it was a pleasure for the fellows to listen to the Colonel and watch Bill's face as he told his story. Bill has a right to be pretty proud of his brother Frank.

Colonel MacMahon introduced Lieutenant Colonel "Mike" Murphy, of the Army Air Forces, who has been one of the leading Army officers in the training of glider-borne forces. Colonel Mike began his first airplane activity as a barnstorming pilot, thus learning to land in any cornfield available. This background stood him in good stead in landing gliders in cornfields and less during the Normandy invasion. Colonel Murphy told of the first Army attempts at glider activity using fragile sailplanes, which were good fun to play with but of little military value. These planes were soon displaced by gliders having substantial structure and heavy wing loading, capable of carrying light artillery, jeeps, and other combat equipment. The gliders presently used are not sailplanes at all but are merely a means of getting equipment and men from a 5,000-foot altitude to the ground without smashing everything to bits.

Colonel Mike was the senior training officer preparing glider-borne forces for the Normandy invasion for months before D-day. Practice was held daily in England, and training had reached such a state of repetition that the troops were glad when D-day arrived and they could break the monotony by participating in the Normandy landings. Colonel Mike's glider was the first glider in the thousands to land in Normandy. Having the fellow right in the room with you telling you the intimate details of such events is an experience that none of those present will soon forget. Colonel Mike was injured in his landing because, as he expressed it, his glider tried to fly between two trees which were close together, and it happened that there was a third tree between the two. However, other gliders which landed seconds after Colonel Mike's were sufficient to accomplish the mission, and, as everyone knows, the American forces carried the day. Colonel Mike was hurt on D-day minus one and before the amphibious forces had landed across the Channel was receiving all possible assistance at a field hospital staffed by the glider forces. The American amphibious troops had to take the beach before he could be evacuated back to the Channel and later to England via a landing ship for tanks.

Following this talk, restricted films on glider activity furnished pictorial evidence of the stories we had just heard. Our quartet is getting almost to the professional stage in the pleasing music they give us. Harry Fisk '22 has turned out some fine singers, who performed ably on the 12th. Joe Gaffney '28, the pianist everybody loves to hear, had to be away, but A. M. Pedersen '12 ably accompanied the singing of the Stein Song at the close of the meeting.

Present were the following: 1887: G. H. Parks; 1889: G. W. Stone; 1890: J. G. Crane; 1891: W. B. Douglass; 1892: B. P. Du Bois; 1893: P. H. Thomas; 1896: W. E. Haseltine, M. O. Leighton; 1897: P. L. Dougherty, F. A. Hunnewell; 1900: H. C. Morris, M. L. Sperry, C. H. Stratton; 1902: G. E. Marsh; 1903: W. L. Cook; 1904: A. M. Holcombe, F. W. Milliken, G. H. Shaw, G. N. Wheat; 1905: O. C. Merrill; 1911: D. P. Allen, W. H. Martin; 1912: M. C. Mason, A. M. Pedersen; 1915: A. D. Beidelman; 1916: W. H. Blank, V. L. Ellicott, F. P. Upton; 1917: J. P. Ferrall, A. R. Williams; 1919: A. H. Blake, E. M. Kenison, M. P. Smith; 1921: L. W. Conant, J. A. Mahoney; 1922: H. H. Fisk, G. R. Hopkins, W. K. MacMahon, C. A. Moore, J. R. Morton, R. K. Thulman, W. J. Woodruff; 1924: G. E. Lamb, R. P. Schreiber, H. B. Stevens; 1925: A. L. Sherman, H. E. Weihmiller; 1926: S. J. Cole, J. G. Fletcher, R. S. Wilson; 1927: E. G. Cowen, G. E. Thomas, R. M. Tucker; 1928: A. E. Beitzell, G. D. Mock, G. P. Palo; 1929: N. P. Stathis, G. R. Williams; 1930: A. F. Bird, J. R. Bloom, C. W. Maskell, N. C. Nelson, F. W. Turnbull; 1932: R. S. Husted, F. M. Moss, R. W. West; 1933: S. F. Allison, C. W. Bohrer, F. K. MacMahon; 1934: J. F. Burke, G. E. Powers; 1936: T. J. Cox, C. E. Crede, H. F. Lippitt, E. R. Pettibone, W. B. Sharp, Jr.; 1937: E. A. Ferris, A. M. York; 1938: J. W. Steiner; 1942: Z. W. Wilchinsky. — FRANK W. MILLIKEN '04, *Secretary*, 613 North Greenwich Street, Falls Church, Va. ALBERT F. BIRD '30, *Assistant and Review Secretary*, 5070 Temple Hills Road, Southeast, Washington 20, D.C.

CLASS NOTES

1887

Our sympathies at this time go out to Lonsdale Green for the loss of his wife, who passed away on March 29 after a long illness, according to a recent letter from our classmate. Lonsdale himself still has some arthritis but is able to get around fairly well.

Your Secretary was pleased to receive a short call from Ralph Curtis, who dropped in while en route to Boston to "pass the time of day," as the old saying used to run. Ralph is very pleasantly situated in Danvers within a short walk of the business center of the town, where he is making new friends and beginning to feel quite at home. He appears to be in good health and to have survived the tough winter in remarkably good shape.

No other news from our classmates has been received of late, your Secretary regrets to add, which makes this a rather meager repast to serve to an expectant multitude. If, however, true to our class motto, "we

look for better things," we may possibly have better luck next time. — NATHANIEL T. VERY, *Secretary*, 15 Dearborn Street, Salem, Mass.

1888

Samuel Graham Neiler, senior member of Neiler, Rich and Company, consulting and designing mechanical and electrical engineers in Chicago, passed away at his home, 737 North Oak Park Avenue, Oak Park, Ill., on February 28. A short while ago Neiler wrote as follows: "After my two years' special course at the Institute, I took what at that time was in the nature of a postgraduate course in the University of Minnesota. After completing my studies there, I was connected with the Minneapolis, St. Paul and Sault Ste Marie Railroad, as assistant mechanical engineer. After two years' connection with the 'Soo' Railway Company, I resigned and entered what was known as the expert course at the factories of the Thomson-Houston Electric Company, Lynn, Mass. Within a few months after my entrance to these works, I was made assistant engineer in charge of the marine department at the factory. After some seven months' connection with the factory, in May, 1891, I was appointed assistant electrical engineer in charge of entire New England construction for the Boston office of the Thomson-Houston Company. I resigned this position to accept one with the World's Columbian Exposition Company, and from September 1, 1892, to April 15, 1894, I held the position of assistant electrical engineer in that same company. After severing my position with the Fair, I entered the firm of Pierce and Richardson, as an associate engineer." In 1908 Neiler was president of the corporation of Pierce, Richardson and Neiler, engineers in Chicago. He was a member of the jury of award for steam engines at the Louisiana Purchase Exposition in St. Louis and consulting engineer for the Chicago and Northwestern Railway Company.

James Otis Handy, who is now a consulting chemist at Orlando, Fla., says that actually he has been practicing metallurgical chemistry more than mining or metallurgy since 1886, but every now and then one of the last two subjects would dominate his activities. In 1908 he discovered a silver deposit of commercial value in Cobalt, Ontario. In the early years of the present century he made several inspections of ore deposits in the United States, Canada, and South America. In the 1920's he testified as an expert in the famous patent suit of Carson versus various smelting companies, which involved the infringement of patent on side charging of reverberatory furnaces. He had been in Florida serving the Citrus Packing Industry as chemist since 1935. He was in Pittsburgh for 40 years, directing chemical and metallurgical investigations with the Pittsburgh Testing Laboratory.

Means writes from Lakeland, Fla., as follows: "Your letter has been forwarded from Ashland, Ky. Instead of being in a flood district, I am visiting in a place where for five weeks there was only one-third of an inch of rain. This has been an ideal Florida winter for tourists, as we are called. If I had not graduated from golf, I could have played every day. Ashland happens to be located so that it seldom suffers more

than the closing of the industries for a few days. Most of the residential section is above flood level, and the same is true of the business section. Our neighboring cities of Huntington, W. Va., and Ironton, Ohio, have flood walls for their protection. Our golf courses are perhaps 50 to 70 feet above flood level. In February, 1884, when I was in college, Marietta, Ohio, had a flood, and there were four and a half feet of water on the first floor of the house where I boarded. At the time of the 1913 flood I was living in Virginia and made a visit in Cincinnati just ahead of the flood and had to go an extra 300 miles to get back. It so happens I have never been in Ashland during a real flood. I always enjoy your class report in *The Review*.

The Boston *Herald* carried the following dispatch from Framingham, Mass., dated April 3: "Funeral services for Nathaniel I. Bowditch, 79, Middlesex county commissioner since 1926, will be held . . . in St. Mark's Episcopal Church, Southboro. In honor of Mr. Bowditch, who died . . . at his home 618 Edmonds road, flags on all county public buildings will be flown at half-staff. Mr. Bowditch was born in Southboro and was educated at Noble & Greenough and St. Mark's schools and at . . . Technology. After a few years' association with the investment firm of Lee Higginson & Co. in Boston, he joined his father, E. Francis Bowditch, in farming and devoted the rest of his life to that pursuit. He was a founder and president of the Middlesex county extension service, which was formed in 1917; a trustee of the Massachusetts State College since 1892 and the oldest state college trustee in the country; president of the Massachusetts Society for the Promotion of Agriculture; a member of the national 4-H Club committee; vice-president and a trustee of the Framingham Union Hospital and a member of the Somerset Club of Boston.

"Mr. Bowditch married Margaret Choate of Southboro in 1890. Until her death in 1926, she was prominent in civic affairs in Framingham, and especially interested in the Union Hospital. Appointed to fill a vacancy on the Middlesex board of county commissioners in 1926, Mr. Bowditch was re-elected for succeeding terms, serving as chairman for many years. He was last re-elected last November. He and his brother, John P. Bowditch, operated the Milwood Farm, one of the largest in the state, for many years. Later, he confined his efforts to scientific farming on his 200-acre estate, 'The Lilacs,' on Edmonds road, here. In addition to his interest in county affairs, Mr. Bowditch served as tree warden in Framingham for 20 years, and as a member since 1908 and later as chairman of the town park commission. On his 75th birthday, he was the guest of honor of Massachusetts State College, at a dinner at Lord Jeffrey Inn, Amherst, where Gov. Saltonstall was the principal speaker. Later, he was granted an honorary degree of Doctor of Laws by the college. In addition to his brother, he leaves a sister, Mrs. Reginald W. Bird, of Boston and Arlington."

Recently the Princeton "Old Guard," of which your Secretary is a member, visited the plant of the Heyden Chemical Company at Penns Neck, two miles south of Princeton, where they were shown every courtesy by B. W. Parker '33, VII, in charge of

the control division of this outstanding production center of penicillin. Dr. Parker a few weeks ago visited a meeting of the Old Guard and explained the process by which penicillin is produced. The papers have recently reported from this plant the largest single shipment of the wonder drug which has ever been assembled. The plant presents bewildering batteries of tanks and retorts in which the mold is generated and by which the product is refined and brought to the condition required for its use in medical service. The plant is built entirely of concrete and brick and employs 300 men and women. At the conclusion of the two-hour tour through the plant, Dr. Parker and the Secretary gave the long Tech cheer for the benefit of the 40 other members of the Old Guard, which is largely made up of retired Princeton professors, missionaries, and Presbyterian ministers.

Frank Ladd writes as follows: "I should like very much to meet all the boys again. Although I do not expect to do so, I can still wish it, since wishes are not rationed. My weight is down to 170. The operation, after effects, and Father Time are at fault. My appetite is good and adjusted to the point program. They raise some fine beef around Tulsa, but we do not get it to eat any more. The prize steer brought \$5.00 a pound and weighed 1,000 pounds when 12 months old. My son has been in Washington lately, and he could not get meat east of St. Louis. I know you will enjoy the meetings at Princeton. If Wilson had been a politician instead of a college president, he would have had an easier time. By the way, read *Yankee from Olympus*, O. W. Holmes's career. He was a salty Yank if there ever was one. I have read it three times and shall do so again."

Your Secretary goes back to Maine early in May, and Assistant Secretary Thompson has a new address, as you will note, for the Thompson and Lichtner Company has removed its management division offices to the Park Square Building in Boston. — BERTRAND R. T. COLLINS, *Secretary*, Chebeague Island, Maine. SANFORD E. THOMPSON, *Assistant Secretary*, Thompson and Lichtner Company, Inc., Park Square Building, Boston 15, Mass.

1890

Walter Gibson Peter, who took the two-year course in Architecture, died in Washington, D.C., on February 9, aged 76. In a conversation with the Secretary in 1940 he said that he had designed some big buildings, especially college buildings, but was going to take it easy. Among these buildings were the Georgetown Preparatory School, the main building of the Walter Reed Hospital, the Willard Hotel, the Union Trust Building, the First Church of Christ Scientist, and the Evening Star Building. A member of the firm of Marsh and Peter until his partner died in 1920, he afterwards continued the business in his own name. He was a fellow of the American Institute of Architects and head of the boards of directors of Louise Home and the Linthicum Institute. He was also a member of the Virginia Society of the Order of the Cincinnati. In his younger days he was active in tennis and golfing circles and at one time was the District tennis champion. He frequently played in golf tournaments at the Chevy Chase Club, of which he was a

member. Washington papers referred to him as a "scion of one of Washington's oldest families, the son of Dr. Archibald Peter and Martha Custis Kennon, the great-great-granddaughter of Martha Washington." He leaves his wife, Grace Dunlop Peter, and a son, Walter G. Peter Jr., a lieutenant in the Navy.

Every member of the Class with whom the Secretary has had an opportunity to talk has expressed his intention of being present at the class luncheon at the Statler Hotel at 1:00 P.M. on Saturday, June 23, in celebration of our 55th anniversary. — GEORGE A. PACKARD, *Secretary*, 50 Congress Street, Boston 9, Mass. HARRY M. GOODWIN, *Assistant Secretary*, Room 4-242, M.I.T., Cambridge 39, Mass.

1892

We have recently received news of the death of Severance Burrage on April 11, after a brief illness in the Colorado General Hospital at Denver. He was born in West Newton, Mass., on July 18, 1868. Entering Technology in 1888, he chose Course VII, specializing in bacteriology, and was graduated in 1892 with the bachelor of science degree.

Dr. Burrage began a long and notable career in public health service as an assistant in the Department of Biology at the Institute, following this position with two years as assistant bacteriologist for the Massachusetts State Board of Public Health. In 1895 he accepted an appointment as professor of sanitary science and bacteriology at Purdue University, in which capacity he served for 17 years. While at Purdue he was a lecturer on hygiene in the training schools for nurses at the Home Hospital and the Central College of Physicians and Surgeons at Indianapolis, also at St. Elizabeth's and State Soldiers' Home hospitals at Lafayette, Ind. He was a lecturer on sewage disposal at Indiana University in Bloomington and served as deputy health officer for the State of Indiana. He was director of the National Tuberculosis Association and president of the Indiana Tuberculosis Society from 1911 to 1917, and for two years was director of the biological laboratory of the Eli Lilly Company in Indianapolis.

During World War I, Dr. Burrage was sent as sanitary officer with the Red Cross to Serbia and Greece with the rank of major. For this work he was decorated by the Serbian Government with the Orders of the Serbian Red Cross and San Sava. On his return to this country in 1918 he was appointed sanitary inspector for the United States Public Health Service, with headquarters in Denver, to make a special study of indigent, migrating consumptives in the Southwest.

In 1920 he received an assistant professorship in the school of medicine of the University of Colorado, later on being raised to the grade of associate professor. In 1930 he was chosen as a delegate to the International Health Conference at Dresden. He received honorary degrees of doctor of philosophy from Hanover College and doctor of public health from Valparaiso University.

In 1936 he retired as associate professor emeritus in bacteriology and public health in the University of Colorado school of medicine. After withdrawal from active

teaching, he continued until the time of his death to assist in bacteriological work at the Colorado General Hospital and to advise in the teaching of bacteriology. He also continued his lectures in the schools of nursing at the Denver General Hospital, at Loretta Heights College, and at the University of Denver, as well as his private work in bacteriology. The following tribute has been received from the dean of the school of medicine: "Dr. Burrage was a much-beloved member of the school of medicine faculty. Although he retired a number of years ago, he retained an office in our department of bacteriology and assisted with the hospital work and also with the teaching of bacteriology. He was always a favorite with the students and was never too tired or too busy to talk with them and to help them."

Burrage was co-author with H. T. Bailey of a book on school sanitation and decoration, as well as the author of over 35 scientific papers in his chosen field. He was a fellow of the American Public Health Association and of the American Association for the Advancement of Science and a member of the Colorado and Wyoming Academy of Science, of the Medical Society of the City and County of Denver, of the Rotary Club, the Ben Franklin Club, and the Cactus Club in Denver. He was active in the Laymen's League of the Unitarian Church and served on the board of trustees of that church in Denver. He was married in 1898 to Elizabeth Wadleigh, who survives him. He also leaves two daughters, Barbara Burrage Stavenitz and Christene Burrage Ellis, and two sisters, Caroline S. Burrage of Wellesley and Mrs. James H. Barnard of Norwell.

Always keenly interested in class affairs, Sev Burrage attended many of the class reunions, during the latter years coming half way across the country to do so; and his spirit of good fellowship added much to the enjoyment of these affairs. A good golfer, he made a point of reporting at the 45th reunion that he had celebrated his 65th birthday by playing 65 holes of golf, scoring 40 on the last nine. We shall always remember him as one of our best-known, most friendly and well-liked classmates. — CHARLES E. FULLER, *Secretary*, Box 144, Wellesley 81, Mass.

1894

The Secretary left Boston for Chicago on February 18 to attend a meeting of the directors of the Refrigeration Research Foundation, of which he is chairman of the board. Two days later, with the research director, H. C. Diehl (Michigan State College '18), he took the *City of San Francisco* streamliner to Berkeley, where the director's office is located. The main object of this journey was to visit some of the various research projects sponsored by the foundation which are now going on in 18 educational institutions in 12 states throughout the country. This trip, even though hurried, gave the Secretary a much desired opportunity to see some of his classmates and old friends, an extremely enjoyable part of the experience. This account may be more interesting if written in the first person from now on.

Arriving at Berkeley on Washington's Birthday, I telephoned to Austin Sperry and arranged a call for the following eve-

ning. I was also able to call the Price Ranch at Los Alamos and talked with Mrs. Price, as Ray was just finishing a five-day sojourn in the hospital as the result of an attack of mild pneumonia, which had quickly responded to treatment. In two busy days spent in the Bay district I was able to go over two of the research projects with the men in charge, lunch twice at the Faculty Club with friends on the University of California faculty, be entertained at dinner by friend Diehl, visit the western Regional Research Laboratory of the United States Department of Agriculture, where a dozen more friends were seen, attend an early dinner of a group of the Institute of Food Technologists which I left early, and then, as the high spot of these two days, spend two or three hours with Austin and Mrs. Sperry in their delightful home. Both were in excellent health and spirits. We found much to talk about, and the range of conversation covered everything from our early Tech days and recent class reunions to the war, and especially the parts our children and their wives and husbands are taking in the varied and widespread war efforts. Austin's son, Austin, Jr., is in an administrative job in one of the big shipyards; one son-in-law is in the Navy and another in war research at the University. Of course we had to brag a little of our grandchildren, and as the Sperrys could boast of a comparatively new pair of twins among theirs, while my latest accession was a yearling grandson, the odds were in their favor. Both Austin and his wife expressed much regret that they could not have been with us last June at Swampscott — a regret that all his classmates who were present fully shared. With a promise to lunch with him the following Thursday, I left his hospitable home, and it was past midnight when my good friend Diehl dropped me at the St. Francis.

The next morning I made an early start for Los Alamos for a 24-hour visit with the Prices. Going via the Coast morning express, I left the train at San Luis Obispo and was surprised and delighted to be met and welcomed by Mrs. Price. We were then driven the 60 or so miles through beautiful country with occasional views of the sea to the Price Ranch. Here Raymond, unchanged in appearance and practically recovered from his recent illness, greeted me with a warmth and affection I shall never forget. It was a delight to enter this hospitable home. As our friendship dates from the beginning of our freshman year and has grown in strength and understanding in all the intervening years, we had a very happy reunion, made the more enjoyable by the presence of his charming and efficient wife. The Price Ranch is situated in one of the most beautiful spots I have ever seen. Here the Prices live in the midst of their 4,000 acres. The house is practically surrounded by Mrs. Price's gardens with an outlook across valley, field, and pasture to wooded mountains at just the right distance in every direction. This spot, not too remote from the conveniences of the city, seems the perfect place in which to enjoy life and pursue one's hobbies after withdrawing from a busy professional or business career. Even the fact that some of his lands are already producing oil has not detracted from the natural beauty of the spot — nor from the value of the property.

We strolled about the buildings and gardens a bit, and a lovely little guest house embowered in trees was put at my disposal for the night and promised for a future visit, when I hope to take Mrs. Prescott.

In this perfect spot in the quiet hills of California, now green with springtime, I could not help contrasting Price's external surroundings with those when I had visited him in Paris in 1938 in his charming apartment overlooking the Seine. How much of the furnishings of that apartment may now exist unspoiled is problematical as it had been occupied and probably ravaged by a German officer during the occupation of Paris by the Nazi forces. The California home on the ranch has, however, all the qualities that make for happy and peaceful living.

On Sunday Ray and his wife and their efficient chauffeur and general helper drove me over the mountains to Santa Barbara, a trip of nearly three hours, highly scenic in character. Here I bade them farewell and took the train for Los Angeles. Three busy days in and about that metropolis gave me an opportunity to visit more laboratories and research projects, to spend a night at Pasadena with my good friend, Colonel Vestal, who for several years just preceding his retirement was in charge of the Department of Military Science at the Institute. I also dined most pleasantly with a small group of Tech men and found opportunity to call on some cousins, one of whom I had not seen for 40 years. On Wednesday evening I left for San Francisco, dropped off at Burlingame in the morning and drove to the city with Hugh Griswold '29, one of my old students and now the efficient manager of the Owens-Illinois Pacific Coast Company. After a semibusiness call at the Golden State Company, I was taken to the world-famous Bohemian Club, where I found Sperry and Jack Nowell and Arthur Fowle '93 waiting for me. We had a very jolly luncheon, with much reminiscence of Tech days. Nowell, now retired, lives at San Mateo, where he gave his time for several years to public service for the town and is still active in good works. Fowle, after years of chemical engineering in Mexico, is also retired, but operates a very successful apricot ranch a few miles below San Francisco. Our party broke up about two-thirty, and I was whisked away on a 200-mile drive to Fresno, where the next day I saw another of our projects and then had a long drive to Sacramento to sleep, before visiting the final one at Davis and returning to Berkeley to catch my eastward train.

I came back via Ogden and Denver, and between trains had a happy luncheon with an old friend, Severance Burrage '92, and called on Frank Shepard '87. It was a shock to learn less than a month later that Burrage had had a severe heart attack from which he died on April 11. Coming East I stopped at Kansas State College, the University of Nebraska, and Iowa State College to discuss other of our projects. En route, I had two hours or so in Omaha and spent one of them most enjoyably with Arthur Rogers of our Class, whom I had not seen since graduation. Rogers resigned from the Telephone Company a dozen or more years ago and has a manufacturing business which engages a part of his time. Like most of the rest of us he has grown gray and lost some hair, but is in more than fair

health and has retained the quiet humor that characterized him in Tech days. In Chicago I lunched with Milton Parker '23, one of my old boys, talked with another, Matt Highlands '34, a captain on the Chicago Quartermaster Depot staff, and dined at the home of Jim Barker '07 of the Corporation, meeting two of his sons, who happened to be on temporary leave from the Army. I cannot forbear mentioning also a wonderful showing of fishing movies taken by Jim and his wife in Maine and Wisconsin. Both are ardent fishermen. It was a delightful evening.

No record in these years seems to be free from items which give us much sadness, and it is with a heavy heart that I record the death of Leonard Tufts, who died at Pinehurst, N.C., on February 19, after an illness of seven weeks with virus pneumonia. He was in his 75th year, having been born in Medford on June 30, 1870. He was prepared for the Institute at Stone's private school, entered with our Class in 1890 but left in his senior year to join the staff of the American Soda Fountain Company, of which his father was president. Leonard was an executive in this company until 1906. His career, however, was almost entirely spent in developing Pinehurst and in research there on the scientific principles of genetics as applied to cattle breeding. His reputation in this work is world-wide. His Pinehurst work actually began in 1895 when James Tufts bought 5,000 acres of sand-hill lands in Moore County for \$5,000 and began the creation there of a winter resort and recreation center. The story of this development is a remarkable one, and Leonard was responsible for it to a great extent. On his father's death in 1902 Leonard became its owner, and from that time on he devoted his energies to building up not only his famous resort but also the many collateral things which would be of greatest service to the community and to the state. Pinehurst became the outstanding golf center of America; and the village became a model town and a pleasant place to live.

The copy of the village paper, the *Pinehurst Outlook*, of February 23, was in large part devoted to eulogistic articles and editorial appreciation of Tufts's constructive work and admirable personality and character. One statement may be quoted here: "Leonard Tufts was a very pleasant gentleman, a familiar figure on the walks of the village. He knew everybody, and everybody knew Mr. Tufts and admired him. He was referred to for years as 'the little man with the big smile.' Mr. Tufts's principal diversions were books and hunting. He was seldom seen on the streets without a book under his arm, or in the fields, during his younger years, without a gun, following his pointers and setters. Pinehurst has lost the man who made it, but under the guidance of his son, Richard S. Tufts, it will live on." Leonard's four children survive him: Richard S. and James W. of Pinehurst, Mrs. Esther Latting of Andover, N.H., and Albert S. Tufts of Chapel Hill, and in addition nine grandchildren. It was a very great pleasure to Tufts to be able to meet with members of his Class at our 50th reunion at Swampscott, and all who were present there were warmly attracted to this man whose friendly, modest, quiet personality revealed his fine character. By all the best standards

he was one of the most successful and influential men of the Class.

With deep regret the Secretary records also the death in Brookline on April 30 of Wallace William Pratt of Hingham, at the age of 74. Pratt was of an old family in this town. He entered with the Class in 1890 and remained during the first two or three years as a student in Mechanical Engineering. After leaving Technology, his interests were extended in the field of civil engineering as well, and for several years he was resident engineer at the Farnham dam near Lee, Mass. In 1911 he became town engineer for Swampscott, Mass., and served that growing town in this capacity until his retirement in 1941. While in Swampscott he was engaged in many interests and was especially active in Masonic circles. On his retirement he removed to his old home town of Hingham, where he resided until his death. He leaves his wife, Gertrude Fearing Pratt, two sons — Fearing (M.I.T. '22), an engineer with the New England Telephone and Telegraph Company, and Richard Williams (M.I.T. '30), a banker in Boston — and also a daughter, Emily. To them the warm sympathy of the Class is extended.

I must record another death, which, while it does not strike us with such poignancy, is nevertheless a real loss to '94's roster. Annie E. Allen was a special student with Mrs. Richards in our junior year; she became much interested in the Technology Women's Association and was for many years one of its officers. Miss Allen was much older than the other women students of the period, having been born in September, 1858, in Cambridge. She was graduated from Smith College in 1882. Ten years later she became deeply interested in the great work of Ellen H. Richards and so spent a year of study with her at the Institute. She died on March 1 in her 87th year.

These notes are already lengthy, but the Secretary would add one more item. James C. Kimberly (Jim to us) has returned to his old home in Neenah, Wis., from his winter home at Tryon, N.C. In recent years he has spent much time in Washington as an unpaid helper in fields in which his large experience as a member of the Kimberly-Clark Company, paper manufacturers of national distinction, has made him especially well informed and competent. — SAMUEL C. PRESCOTT, *Secretary*, Room 3-233, M.I.T., Cambridge 39, Mass.

1895

Charlie Tillinghast of Providence, R.I., gave your Secretary the first news of the passing of George Reuben Howarth, II, who died at his home at 163 Butler Avenue, Providence, R.I., on February 22. George had been in the real estate, mortgage, and insurance business in Providence since 1914. Before this he had been interested in and followed the locomotive business. His father had been superintendent of the Rhode Island Locomotive Works, and George, with Ed Huxley, chose as their thesis at Technology, "the practical test of the big locomotive." Some will remember the curious sight of the ingeniously arranged contraptions fitted to the engine of the *Shore Line Flyer* of the New York, New Haven and Hartford Railroad in November, 1894. Up to this time only one such test

had been made, in 1884 by H. F. Baldwin. Howarth and Huxley were the men who braved the elements from the cowcatcher with the engine's drivers revolving at the rate of 300 revolutions a minute; truly these two lads were aptly named "the intrepid cowboys of 1895." Howarth and Huxley needed help on their tests, to record the happenings in the engine cab. Dick Sheridan and Frank Miller were chosen as their aids. Nothing daunted the mechanical quartet. The passing of Howarth spells the finale of a foursome friendship in the Class of 1895.

After his graduation Howarth served in turn with the Rhode Island Locomotive Works and with the Baldwin Locomotive Works at Philadelphia. In 1903 he worked for the American Locomotive Company in Canada. Always interested in chemistry and science, he was at one time assistant principal and teacher in the Providence night school. He was a member of the Phi Beta Epsilon fraternity. Surviving him are his wife, two daughters, a sister, and a brother, and four grandchildren.

Fred W. Draper '95, is now with the Bonneville Power Administration of the United States Department of the Interior, at Portland, Ore., and says that he is taking much interest in attempts to induce new industry to locate in the Northwest, where there are many raw materials awaiting development, much cheap hydroelectric power, and a wonderful climate. He is living high in the hills west of Portland, where he has an unrestricted view of Mount Hood, Mount St. Helens, and the city of Portland. Last year he ran a victory garden which yielded produce and at the same time gave him the exercise needed to counteract the effect of his natural love of good things to eat. After all his travels over the world he still has a longing for his native soil of New England.

John H. Gardiner of 10 Clinton Place, Mount Vernon, N.Y., chairman of the price panel of the Mount Vernon ration board and former chief statistician for the Graybar Electric Company in New York, died on February 22 in the Mount Vernon Hospital at the age of 72. Born in Jamestown, R.I., a son of Mary and Allen Gardiner, John was graduated from Technology in 1895. Moving to New York, he worked for the Westinghouse Electric Manufacturing Company and the Western Electric Company. He served Graybar for 20 years until his retirement five years ago.

We are fortunate to be able to include in this issue the plans for our 50th reunion. Although members of the Class will have received the various bulletins of information, we are glad to tell our many friends of earlier and later classes how we plan to celebrate our 50th anniversary. We shall meet at the New Ocean House, Swampscott, Mass., early on Friday morning, June 22. Some will remain at Swampscott during the three days, Friday, Saturday, and Sunday, for rest and reminiscence; while others will leave Swampscott for Boston at about noon on Saturday, to attend the Class Day exercises in the afternoon and the Alumni Dinner in the evening. Al Sloan will speak for the Class at the Class Day exercises, and we shall hear Gerry Swope at the dinner on Saturday evening. To those who have not finally decided to attend our reunion — remember, this happens only

once in a lifetime. Come if you possibly can — it will be great to see you. — LUTHER K. YODER, *Secretary*, 69 Pleasant Street, Ayer, Mass.

1896

At the time these notes are being written, the No. 1 bulletin on our 50-year anniversary is being prepared to go to all members of the Class. This bulletin asks for the sentiment of classmates regarding the holding of our celebration next year at East Bay Lodge, and for suggestions regarding a 50-year memorial to M.I.T. from the Class. Appeal is also made for payment of dues to replenish the class treasury.

Irv Merrell wrote from St. Petersburg, Fla., that he had been under the weather from one of his old complaints, but was getting back into circulation. While he was laid up, it was his misfortune not to see Joe Clary and Mrs. Clary at the time they called at his office when they were in St. Petersburg. It seemed that the Clarys were looking for a place to spend their retirement basking in the sunshine. The result was that Irv had finally received a letter from Joe about the middle of April reporting that he had bought a house in St. Petersburg and he and Mrs. Clary were leaving to dispose of their belongings in Chevy Chase, with the expectation that they would be back in St. Petersburg late in the fall.

Rockwell had a report from Richard Allen that on March 21 Alice Adell Allen had arrived, weighing 8 pounds and 4 ounces, so that Mark Allen is now a grandfather again. The Secretary had a post card from Myron Fuller to the effect that he had been allowed sufficient gasoline to travel back to Massachusetts in his auto, so that he was leaving Rockport, Texas, about April 20, with the hope of getting home about May 1, where his address would be 60 Main Street, Brockton 62, Mass.

The Secretary also had the pleasure of visiting Charlie and Bertha Tucker on Sunday, April 15, partaking once more of the Tucker hospitality and Bertha's fine products of the culinary art. With the scarcity of local help Charlie has been able to carry on his orchard only through English sailors who were available while on their furlough in Boston and who were glad to make a little extra money. The very early season in New England this year had brought his apple trees and his peach trees into bloom, and his fear was that cold weather later might cause much damage. There was some satisfaction, however, from the fact that many of his apple trees were not blooming this year, so that the damage would not be so great as it would have been if all the trees had bloomed abundantly. There was also the further satisfaction in looking ahead that he would not have so many apples to pick next fall.

A letter from Henry Sears in Wichita, Kansas, gives very little news, but apparently Henry is happy in his retirement and his fine relations with the faculty of the Wichita University, where the science group had elected him to Delta Epsilon, an honor society. Mrs. L. O. Schmidt, who was originally Elinor Stickney, the daughter of our classmate Joe Stickney, wrote the Secretary that she had been spending a few days in Boston welcoming her husband, who had recently returned from long service overseas. It had been

her desire to meet some of Joe's classmates in Boston and extend his greetings to them, but her week in Boston with her husband passed so quickly that she was disappointed in not having made any contacts.

Elbridge C. Jacobs, Professor Emeritus of the University of Vermont, still continues his activity as state geologist and has just sent to the Secretary his biennial report. This report features the old copper mine at South Strafford, Vt., which has been reopened during the war and is again producing copper, with the expectation that under modern conditions the mine will continue to operate profitably after the war ends. Work at this famous old mine dates as far back as 1793, when the deposit was first used for the manufacture of copers. Jacobs also sent a clipping from the Burlington, Vt., *Free Press* of April 4, which gave an account of the testimonial dinner given by a group of 70 friends from the State Board of Health in honor of Charles P. Moat, chemist and assistant director of the Laboratory of Hygiene, who was retiring in April after 44 years of service. It was apparently a very fine occasion, with toasts from the head of each division of the State Board of Health, as well as many congratulatory letters and messages from former members of the board who had known and worked with Moat. Miss Fannie L. Pierce, who had been a member of the department longer than any other woman on the staff, made a gift presentation of a pen and pencil set and a war bond as tokens of esteem. This gift was accompanied by a scroll inscribed with appropriate words and signed by all the members of the public health department.

It is with great regret that the Secretary reports the death of Eugene C. Hultman on April 22 at his summer home in Duxbury, Mass. Earlier in the week of his death he had moved from his apartment in Boston to his summer home on Duck Hill in Duxbury, and undoubtedly he overtaxed himself and brought on a heart attack, from which he finally succumbed. After his graduation Gene had worked as a civil engineer with the Massachusetts State Board of Health, the United States Geological Survey, the West End Street Railway Company, and Barbour Stockwell Company. He was for many years engineer for the board of directors of the West End Street Railway Company and was also for a while engineer for the board of directors of the Fitchburg Railway Company; he served in consulting capacity for other organizations. He early started on a political career, in which he had much success. He became a member of the City Council of Quincy in 1902 and went on to the Massachusetts House of Representatives, and later to the Massachusetts Senate. For something like 35 years he had rendered outstanding service to the City of Boston and to the Commonwealth of Massachusetts in the various offices of Commissioner on the Necessaries of Life, Building Commissioner, Fire Commissioner, Police Commissioner, and finally Metropolitan District Commissioner, an office which he held to the time of his death. It has been said in earlier class notes that the Boston papers had announced that Governor Tobin had appointed another man in Hultman's place. This was an error, and the appointment of the other man had been held up by the Governor's Council

week after week because of their apparent reluctance to take the man nominated by the Governor. This was a significant bit of evidence of Hultman's integrity and the high esteem in which he was held. His education and professional experience enabled him to render fine service in all the civic positions which he had occupied. Perhaps the finest testimonial to his memory is that he had the reputation of never accepting any personal gain through his official position, but always worked for the best interests of the city and the state. Funeral services were held in the Arlington Street Church, Boston, on Tuesday afternoon, April 24. Flowers were sent in the name of the Class, and the services were attended by Harry Baldwin, Damon, Driscoll, Grush, P. B. Howard, Locke, Lythgoe, Mansfield, Rockwell, and Smetters, and possibly other members of the Class who were overlooked in the large assemblage. Smetters said that he was temporarily in Worcester on an inspection job in connection with his work for the Sanitary District of Chicago and had seen the notice of Hultman's death in the paper and was able to come to Boston for the services. — CHARLES E. LOCKE, *Secretary*, Room 8-109, M.I.T., Cambridge 39, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge 38, Mass.

1899

Arthur B. Foote's business address indicates that he is a consultant in civil and mining engineering at Grass Valley, Calif. (Box 1026), but from clippings which I have received it is evident that he is very much of an economist and not of the brain truster variety. One clipping from the morning *Union* of Grass Valley is entitled, "Production Is the Buying Power." Another from the same source has the caption, "Buying Power of Money." He has also written at considerable length on the "Post-war Employment Plan" and in another article discusses at some length Francis H. Brownell's article on "International Bimetallism." The Secretary feels sure that Arthur Foote will be glad to go further into detail with any member of the Class who is interested. Maybe later, when I have time to look over these articles more carefully, I shall have something further to say. — BURT R. RICKARDS, *Secretary*, 381 State Street, Albany, N.Y. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston 9, Mass.

1902

Professor Locke has sent in the following items concerning two of our Class from whom we seldom hear: Emilio Madero, who studied mining at the Institute, has never entirely deserted that industry. He says he has always had a mine to work on, to worry about, and to give him happiness. His last venture was in mercury mining, and at the time he wrote, he was prospecting a deposit of manganese. He feels that mining is the greatest business a man can have. Firmin V. Desloge recently wrote that he had followed mining in Missouri and elsewhere for many years but had finally retired some time ago. He had soon wearied, however, of doing nothing and went back into business, taking up the production of crude oil, which is now keeping him busy. He makes his head-

X
quarters at his home in St. Louis, but spends vacations on his San Ysidro ranch in Santa Barbara, Calif.

The attention of the Class is again called to Dan Patch's collection of contributions to the Alumni Fund for 1945. The Class should try to outdo last year's effort and do it quickly to save Dan the bother of writing. — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston 16, Mass.

1904

It is pleasing to be in possession of several bits of information about some of our classmates from whom we rarely hear. Bill Evans was in Boston in late January and requested me to round up some of the boys for lunch with him. So I reached Ed Parker, Cy Ferris, Gene Russell, and Gus Munster, and we had a very pleasant two hours or so at the Statler, going over the good old days and giving our respective versions of how present times could be improved. I regret that I neglected to include this event in the last column of class news. It was recalled to my mind by receipt of the following letter from Bill, which shows him to be an ambassador of good will.

Bill's letter reads: "After my reunion with you, Gus Munster, Cy Ferris, Ed Parker and Gene Russell in January, I learned how to make class reunions myself. That was a good time we had together. I wrote Cal Bascom that I was to be in St. Louis in March and would like to shake his hand after 40 years. Well, I had a delightful time with Cal on Sunday night, March 4. Cal invited me to meet his delightful family, Mrs. Bascom, his lawyer son, Bill, and daughter-in-law, the invitation including my son and daughter-in-law. It was a happy occasion. He has another son, Jack, in the Navy in the Pacific. Cal went with Fayette R. Plumb, Inc., in Philadelphia immediately upon graduation. You may recall that that was in 1904, 41 years ago. In 1910 he went to St. Louis for the company, built a new plant for them there, and has been running it all this time. I told Cal that it looked to me as if he had merely made a good business better, without exciting any extravagant notions. My session with Cal and his family was indeed a delightful reunion which I can recommend to any who travel. In this way I visited with Lawrence Lyon in Pittsburgh and Perrie Arnold in Newark, Del. I travel from the Great Lakes down to the Georgia line, and from Pittsburgh to Memphis, and should be glad to shake hands with any of our Class before our 40th year becomes history." Since receiving this letter, I have had another note from Bill stating that Bascom is vice-president of the Plumb Company and manager of the St. Louis plant.

The next two items were sent me by my most consistent reporter, Charlie Locke '96, whose courtesy I acknowledge with many thanks. After graduation George B. Harrington took a mining job in Mexico. His first assignment was to take charge of a crew of Mexican Indians on a triangulation survey. He found that the pure Castilian Spanish which he had learned in an intensive course in New York was entirely different from the brand of Indian Spanish spoken at Velardena. A little later he was joined in Velardena by his classmate, Charles A. Hardy. After the San Francisco

earthquake and the panic of 1908 he found himself in Seattle and took a temporary job with the Seattle Electric Company, a subsidiary of Stone and Webster. He has been with Stone and Webster ever since. Having studied mining at the Institute, Harrington was interested in the little coal mines operated by the Seattle Electric Company and almost before he knew it became general superintendent of these mines. A few years later Stone and Webster sent him to Illinois to reorganize an old coal mine and become its president. This is the Chicago, Wilmington and Franklin Coal Company, which during his 30 years of management has become widely known as an outstanding example of efficient operation, kept up to date in every respect and making use of the latest developments in mining.

Mark G. Magnuson made his initial venture in mining at Breckenridge, Colo., but went on to a small copper mine in the state of Sonora, Mexico. In June, 1906, he married a Boston girl and quit mining to enter his father's business, which was that of grain elevator operations, with headquarters at Minneapolis. This connection continued until 1922, when he joined Archer Daniels Midland Company to run their castor oil business at Toledo, Ohio — something he knew nothing about; his background of technical education, however, enabled him to develop a very satisfactory business. Through a consolidation of companies, he was finally transferred to New York in 1930 and is now vice-president of the Baker Castor Oil Company, a New Jersey corporation with office at 120 Broadway, New York City. This castor oil business has provided considerable travel since the sources of supply are in the tropics; he spent much of 1928 and 1934 in India and Manchuria. After that the sources switched to Brazil; he consequently spent seven months in 1937 going back and forth and four months thus in 1939. With the coming of the war and difficulties with shipping, the United States Government endeavored to develop castor oil seed in Mexico, and Magnuson was associated with this attempt, making four separate trips, each a month or more in duration, from the fall of 1942 to the spring of 1944.

One more death must be added to the long list reported in our last notes, that of Frederick D. Mabrey, VIII, who died in Key West, Fla., in March, 1944.

Things look now as if we might have a pleasanter summer than last year, and I wish all classmates a happy and restful vacation. — HENRY W. STEVENS, *Secretary*, 1960 Commonwealth Avenue, Brighton 35, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, 3024 Tilden Street, Northwest, Washington, D.C.

1905

Roy Allen, I, wrote from Chuquicamata, Chile, that, having completed a three-year contract with the Defense Plant Corporation, he was returning to this country about May 1 and resigning from D.P.C. He has taken part in the construction of 90 million dollars' worth of new mining and metallurgical plants which are now adding several hundred million pounds a year to our supplies of needed war metals. His address from May 15 on will be 11 Spring Street, Cambridge, N.Y. — Harold G.

Hixon, III, has been since graduation in zinc smelting production, and since 1911 continuously with the New Jersey Zinc Company at their Mineral Point plant in Depue, Ill. Harold has two boys in military service — one in the Army, the other in the Navy. The younger son, David, was graduated from Technology in 1941.

By the time these notes are read, you will have received formal notices of the 40th reunion at Old Lyme, which, as a mid-point between Boston and New York, was the choice of a considerable majority of the Class. Bill Ball and his committee have been working up plans to make this reunion the best ever. With traveling conditions normal, it could easily be the biggest ever. Here's hoping that by that time traffic conditions and gasoline rations will have eased up so that that may happen.

As to vital statistics, Grandpa (for the fourth time) Andy Fisher announces another grandchild — Elizabeth Converse Hunter, daughter of Edith, Andy's youngest daughter, born at the Richardson House in Boston on April 18. Andy insists that at 8 pounds 1 ounce and 23¼ inches this is the handsomest, tallest, and biggest '05 grandchild (at birth, we assume). Hiram Le Roy Walker, II, still with the Lanston Monotype Machine Company in Philadelphia, writes that his only son, Alden, has been in the Navy nearly three years and overseas in North Africa, Sicily, French Morocco, and so on, for nearly two years. He now has the rating of lieutenant.

Through Roy we have received a copy of the Philadelphia *Bulletin* giving the story of the accidental death on March 19 of Dow H. Nicholson, I, a commander in the Navy. Dow and another commander, while driving home from the Navy Yard, were hit by a train at the Bishop Avenue crossing and instantly killed. Nicholson had served in World War I, had been retired, but returned to active duty in January, 1942, and at the time was attached to the Civil Engineer Corps as assistant public works officer of the 4th Naval District. He is survived by his wife, two daughters, and two sons, Lieutenant (junior grade) O. F. Nicholson and Sergeant E. D. Nicholson of the Marine Corps. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston 10, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 71 Newbury Street, Boston 16, Mass.

1906

The *Telephone News* (employees' magazine of the Bell Telephone Company of Pennsylvania) for March included a picture of Percy Tillson receiving an award pin for his ninth blood donation. Percy is engineer of plant extensions in the central area of the Telephone Company at Harrisburg. His son, Henry, reported in the February Review as attending midshipmen's school at Columbia University, was graduated from that school in March and is now an ensign in the Navy.

The midwinter meeting of the Boston Alumni held at Walker Memorial on February 26 was attended by five members of the Class, in addition to the Secretary, namely, Sherman Chase, T. L. Hinckley, Henry Ginsburg, H. L. Lewenberg, and our Assistant Secretary, Ned Rowe. Lewenberg is now a member of the Boston Alumni and is with Stone and Webster.

The Secretary had a letter from Jack Norton, who is with the Upjohn Company in Kalamazoo, saying that he had had a card from A. R. Heckman which stated that the latter had a boy in the Navy and one in the Army. Jack's older son is a senior grade lieutenant stationed at the Puget Sound Navy Yard. His younger boy is a private in the Cavalry, saw action in the Admiralty Islands, and was in the Leyte landing. After about two weeks' campaigning in the Philippines, he was wounded and when the letter was written, was convalescing in a hospital in New Guinea. Jack said that the wound was not serious so far as he knew. — The Secretary's son, J. N. Kidder, a captain in the Army Air Forces, is now stationed at the air base at Jackson, Miss., where he is teaching navigation. On April 10 the Secretary's daughter, Marcia S. Kidder, was married to Lieutenant William A. Sanderson, Jr., who had just received his wings as a pilot in the Air Forces. At this writing (April 23), the young couple are stationed in Lincoln, Neb., where my son-in-law is undergoing his final training.

A letter dated April 19 was received from Ralph Patch, transmitting a letter entitled, "In Honor of Lieutenant Colonel Ralph R. Patch." Written by the general counsel of the American Pharmaceutical Association, this tribute to Ralph ran as follows: "Lieutenant Colonel Patch's retirement in April from active service in the United States Army invites the following statement, which I am privileged and happy to make. Lieutenant Colonel Patch became a reserve officer with this rank in May, 1923. He was called into active service on December 13, 1942; and he has since remained in that service. Therefore, on April 20 he had spent nearly two and one-half years in continuous war service in the United States Army. Throughout this period he was an executive in the Supply Service of the Surgeon General's office at Washington; there he dealt with necessary Army medicinal supplies; and he was chief of a key branch when he was recently placed on the retirement list . . . because of a serious eye affliction, which developed during his service in Washington and for which he underwent treatment at the Walter Reed Hospital; because of this affliction he is retiring from the Army against his will and to the deep regret of his associate officers in the War Department. I have just talked with one of these officers, who has a high rank and position in the Surgeon General's office, and this, in substance, is what he told me, Lieutenant Colonel Patch was a most respected, esteemed, and successful executive in that office; he was assigned work of great responsibility and essential war value, which he did with outstanding ability and efficiency; he was a conscientious and hard worker, who worked seven days a week from early morning until late at night for many months at a stretch and without rest; and by reason of his exemplary character and tremendous devotion to duty, he was an inspiration to all who were associated with him. In short, he gave to our country the full benefit of his great executive ability and deep conscientious regard for his duty and fellowmen; and he literally wore his eyes out in war service. Accordingly, he must now, and for an indefinite period, strictly limit his business

and personal activities, in order to save his sight. But you will be relieved to know that by following this restricted course the present outlook is that he will thus save his sight.

"I do not know of anyone in the pharmaceutical industry who has done more or better in war service at Washington, or who has been so unselfish in such service. When he went to Washington in 1942, he necessarily gave up all business connection with the E. L. Patch Company, of which he is president; and since then he has worked hard and unceasingly, until his eyes gave out. If the industry had a distinguished service cross to confer — which I wish it did have — then he would certainly deserve it. But however great such an honor might be, the greatest honor to Lieutenant Colonel Patch is his own distinguished record of war service to his country in the time of her peril and need. And that service is a heritage of priceless value for his family, his company, and his industry." The letter speaks for itself. Class congratulations, Ralph, upon this wonderful record. Ralph's note informed us that he was scheduled for six months' vacation, which he plans to spend at Cape Cod, and suggests that any classmates who get down to Dennis Port look him up at the corner of Depot Street and Chase Avenue. Ralph left Washington on March 15 and spent three weeks at Orlando, Fla., before returning to his home in Stoneham."

Charles E. Locke '96 sends the following information: Russell P. Reynolds has been with the American Smelting and Refining Company in Colorado ever since graduation and he has been manager of the Colorado department of that company, with headquarters in Denver, for the last 15 years. — Charlie Kasson is now living at 9 Shawnee Road, Arlington, Mass. Since the death of his wife, he has disposed of his home in Milton and is residing temporarily with his married daughter in Arlington.

The Alumni Office has just forwarded a notice of the death of Andrew H. Keleher, VI, which occurred on March 14, 1944. Andy was one of the well-known members of the Class. After graduation, he was with the New York Edison Company for two years and then spent four years traveling for the Holophane Company in South America. In 1912, he went in business for himself as a manufacturers' agent for various items which he sold in South America, averaging about one trip a year. He had attended numerous class reunions although he was not present at the 1941 gathering in Marblehead. — JAMES W. KIDDER, *Secretary*, Room 801, 50 Oliver Street, Boston 10, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

1907

John Allen Davis is now retired and lives at Siasconset, Mass. His work between graduation and retirement was first with the United States Geological Survey and later with the United States Bureau of Mines. His first job was four years of coal land survey and classification. In 1911 he transferred to the Bureau of Mines upon its establishment, and his first work there was a study of tunneling methods. This resulted in a bulletin of the bureau, a book pub-

lished by Wiley and Sons, and the tunneling chapter of Peele's handbook of mining. His next important assignment was as superintendent of the radium work at Long Park, Colo., where he had charge of the mining operations and helped to design and operate the concentrating mills. Following this came eight years in charge of the Alaska Experiment Station of the Bureau of Mines at Fairbanks, Alaska. When this station was taken over in 1924 by the staff of Alaska University, John returned to Washington to serve in various administrative positions until 1928, when he was appointed chief engineer of the Information Division, which had to do with the editing and distribution of publications, preparation of exhibits, and motion pictures. In January, 1942, he had the job of preparing estimates for all the Bureau of Mines appropriations and presenting them to the Bureau of the Budget and to committees of Congress. Six months of this work proved too much for him so that he retired because of poor health. The old home in Siasconset where he lives has been in the family ever since his great uncle, a sea captain, bought it on his return from a voyage around Cape Horn when he took a group of gold seekers to the California gold rush. He finds that, between the virtues of the simple life and the therapeutic qualities of the island where he lives, he has been restored to comparative good health. In 1908 John married Mary Lee Gadwell, a Wellesley graduate, who has acquired some fame as an author and has accompanied John in his various travels. John, also, has written much in connection with his different jobs. (For the above facts I am indebted to Charles E. Locke '96.)

Sam Coupal is no longer director of the Department of Mineral Resources of Arizona but is engaged in private practice as a consulting mining engineer with offices at Room 307, Home Builders Building, Phoenix, Ariz. — Bill Lucey, while still with Rayonier, Inc., has moved from the state of Washington to an office at 122 East 42nd Street, New York City. — Bill Perry's firm, Perry, Shaw and Hepburn, architects, has moved its office to 955 Park Square Building, Boston, Mass. — I have recently checked up on our classmates who are connected with the Du Pont Company and find that Bill Bradshaw is with the rayon department of the company, his residence being at 1900 Riverview Avenue, Wilmington, Del.; Harold Kingsbury is a patent lawyer with the legal department; Hermann Mahr is production manager of the fine chemical division of the organic chemicals department; Dick Woodbridge is technical specialist in the military explosives division of the explosives department; Frank MacGregor is general manager of the electrochemicals department. Frank has a country place in Maryland where he spends many week ends and plans to develop his hydroelectric power site, so as to heat his house, and so forth.

On April 23, just in time for these Review notes, I received a three-page typewritten letter from Stuart Godfrey, Brigadier General and Air Engineer of the United States Army, dated April 13, with heading, "Headquarters India Burma Air Service Command, A.P.O. 671, care Postmaster, New York." From this I quote: "The January number of *The Review* reminds me that I

have not written you for some time. Meanwhile the war in Europe and in the Pacific is making tremendous progress, and the campaign here in Burma is also going well for us. . . . Some of my assistants and I are now enrolled in the M.I.T. Association of India, which is composed mainly of Indians who have attended the Institute, of whom there appear to be some 300 or 400. The war seems to have given an impetus to interest in Technology over here, as India has seen concrete evidence of our mechanical and technical ability, and far more Indians wish to attend the Institute than can be accepted. There is also a plan, which I hope to hear more about, to establish a new scientific school modeled after M.I.T. My staff includes other Tech men, and we are trying to give such time as our crowded schedule permits to encourage and assist some of these activities — the Indians seem so eager for our interest and help. . . . Charles, my son, M.I.T. '40, a captain in the Air Corps at Wright Field, is to be married in May."

With Stuart's letter was enclosed a fascinating map of North America on which is superimposed a map of the Far East, with a descriptive legend written by Stuart. This is so interesting that I pass it on to you readers, suggesting that you first get out your geography textbook and turn to a map of the United States. Then follow his script: "Imagine you are flying across the India-Burma and China Theaters and that each stopping point roughly corresponds to a similarly located point in North America. Your aircraft is a C-47 averaging about 150 miles per hour. At 1800 hours you leave Karachi, gateway to India (San Francisco). Two hours' flight to the southeast is the large seaport of Bombay (Los Angeles). At 2230 hours you pass over New Delhi, capital of India and Headquarters, United States Forces, India-Burma Theater (Elko, Nev.). Continuing east, at 0430 hours the next morning, you reach Calcutta, principal port of India and Headquarters Army Air Forces, I.B.T. (Albuquerque). Far to the south is Kandy, Ceylon, where Admiral Mountbatten administers the South East Asia Command (tip of Lower California). Leaving Calcutta, you fly north and northeast, missing little in the way of scenery, having traversed a flat and monotonous country, but at dawn as you fly along the Brahmaputra River valley you may catch glimpses to the left of the highest mountains in the world, Kinchinjunga, and even Everest if the weather is good. At 0830 hours you are over northeastern Assam (valley of the Platte River of Omaha, Neb.). Turning southeast and flying over the mountains into Burma, you pass high over the winding Ledo Road, and by 1000 hours are over the battle-scarred town of Myitkyina (Wichita, Kansas) recently taken by Merrill's Marauders. Four hours' flight to the south is Rangoon (Houston, Texas). East of here the mountains become really rugged — you are flying over the 'Hump.' The altimeter may register some 14,000 feet. You cross the Salween River Valley into China and at 1130 hours land at Kunming (St. Louis), China terminus of the famed Hump route. Two and a half hours' flight to the northeast lies Chungking, capital of China, Headquarters of the Chinese Theater (Chicago). Then, having set your watch

forward one half hour to compensate for Chinese time, you continue due east to Kweilin, arriving there at 1500 hours that afternoon (Knoxville, Tenn.). Two hours' flight to the southeast are Canton and Hongkong (Columbia, S.C.), but we turn northeast past Hengyang (Charleston, W. Va.) to Hankow (Buffalo, N.Y.), following in reverse the route over which the Japanese have recently advanced. Leaving Hankow at 1800 hours, a three-hour flight takes you to Shanghai on the China Coast (Boston). Far to the south is the northern tip of Halmahera (San Juan, Puerto Rico), from which point MacArthur made the last advance to the Philippines. It has taken you about 27 hours to cross both theaters, allowing little time for refueling. Relying on the railroads of India and on the roads of China and on your own two legs over the 'Hump,' you would do well to complete this voyage in three months. It is fortunate that the last stage of your trip over Japanese-occupied territory has been an imaginary one, but later the real journey may doubtless be made, with a final six-hour hop from Shanghai to Tokyo (St. Johns, Newfoundland)."

Stuart also enclosed an extract from a letter to his wife, Dorothy, dated March 15, from which I quote: "My China trips have afforded incidents and local color that I could relate without violation of the censorship rules. Let me try to do the same with reference to my last visit to Burma. . . . It's an easy hop now to Myitkyina, a place that still recalls the straining weeks last summer when, amid monsoon torrents, with the Japs holding on to the town a mile away, our aviation engineers succeeded in keeping open and improving the miserable little captured strip that was known as Myitkyina Airfield. . . . For six months Joe Stilwell's Northern Combat Area Command, consisting of Chinese, British, and United States forces, had to be supplied entirely by air. This meant that the Tenth Air Force, in addition to its combat missions of bombing and strafing, had to fly in all the food and ammunition and other supplies, amounting during this period to some 100,000 tons, or say 100 trainloads. Some of this was dropped to isolated detachments, let down by parachutes, or simply pushed out of the plane. The great bulk was landed at this one airfield, where for days at a time landings and take-offs occurred at the rate of nearly one a minute. All the engineers, of course, and their equipment — first the little 'airborne' types and then the big bulldozers (count 'em, 48) — had to come in the same way, by air. . . . I wish I could do justice to the magnificent scenery. The Irrawaddy is a majestic stream, flanked with rugged hills, and may be compared perhaps to our Columbia River. As contrasted with India, northern Burma certainly is the 'cleaner, greener land' that Kipling described. . . . Airfields are made in a hurry, at least in some cases, as when we stood on a newly constructed runway in a territory which three days earlier had been occupied by the Japs. . . . The people of — are coming back, resuming their trading, and here at a score of roadside stalls were vegetables for sale and various wares that one would see in a ten-cent store at home. Here again I thought of Kipling, for the salesladies were 'neater, sweeter maidens'

than in India. . . . At Calcutta yesterday, Mohammed, my 18-year-old bearer, greeted me with the cheerful news that he was going away for six weeks to Bahar, 600 miles distant, to marry a 13-year-old girl he had never seen. She would then live with his old mother while he came back here to work. Somehow I prefer the way we arrange those matters at home." — BRYANT NICHOLS, *Secretary*, 23 Leland Road, Whitinsville, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

Under the able supervision of Paul, the New York contingent had a luncheon at the Technology Club on Saturday, April 7. It proved to be quite an occasion. All told, about 15 of us sat down to lunch. Mex Weill, II, had come down from Port Jervis, and it so happened that Chet Dawes, VI, had a date at West Point just then and was with us. Now we always try to have someone from the Institute present to tell us about the happenings on the banks of the Charles. This time we had another 1909 man, though from Brown and not a schoolmate; he was Dean Bunker of the Graduate School. We soon discovered that John was fitting in at our party as if he had been at Copley Square with us. Long since I have discovered that we who have attended these class luncheons for 20-odd years now know each other pretty well. We lose no time in picking up the loose ends left from the last luncheon. Besides, our deepest-dyed philosophers were on hand. What can you expect when John Mills, VI, Jim Critchett, XIV, Reg Jones, VI, and "Admiral" Dale Ellis, XIV, get to talking about such a mundane thing as the assignment of patents in their respective laboratories? Then add John Bunker, and all I, for one, needed to do was listen and wonder how their good heads could really carry all they know. Dean Bunker gave us a glowing report on the Institute and on Dr. Compton, who seems more secure every year as the best college president extant. One item discussed must be included in this report. Reg Jones called me by telephone the other night to ask what I knew of the Class Fund that was launched at the 25th reunion 10 years ago. Reg had taken the trouble, when in Boston recently, to talk with Horace Ford about the present status of the Fund and get some detailed information. He feels that we should keep the Fund continually in mind. Most of the policies are still in force, but he rather feels that more of the Class should participate in so worthy a gesture on our part. I know that I, speaking for myself, feel so indebted to the Institute that nothing I can ever do would even begin to liquidate my debt of gratitude for what was done for me. Reg and I are taking it upon ourselves to study the question, and the Class will be taken into our confidence in the near future. What Reg has particularly in mind is the hope and expectation that at our 40th reunion in 1949 — not so many months away at that — substantial additions may be made to the "Funds for Scholarships, Class of 1909," as Horace Ford lists us in the annual report. In addition to those mentioned above, including Paul, the following were also present:

Harold Ballard, I, Chauncey Crawford, I, Larry Forrest, X, George Gray, VI, Ed Howe, VI, Lester King, IV, and Bobby Hulsizer, VI. George Gray states that Jack '40, is in the Army Specialized Training Program at Ohio State. Bobby Hulsizer, who was a member of the cross-country team, was a patent attorney for a number of years and is now doing electronic and war work with the International Projector Corporation. His son, Bobby, Jr., is in the Radiation Lab at M.I.T., is married, and lives in Belmont, Mass.

When invitations for the class luncheon in April were sent out, this is the acknowledgment that came from Julius Serra, who lived on Staten Island and for many years was on the engineering staff of the builders of the 8th Avenue (Independent) subway in New York. Let Julius tell his own story. His letter is dated March 29, and it comes, not from near-by Staten Island, but from the Pacific Coast. Here's the letter: "I received your card and am sorry I cannot be there as I have not bought my air flivver yet. Our company finished up the iron mine and concentrating plant at Ringwood, N.J., last fall and, as the Brooklyn Tunnel job was shut down for lack of materials, they decided I needed an indefinite vacation, at my own expense, however! So my wife and I packed up the bus and left the house in charge of my oldest daughter and the three grandchildren. The Office of Price Administration allowed me gas to go direct to Seattle, but I decided that my Studebaker could make 20 miles to the gallon instead of the 15 on which O.P.A. had figured; so we went via Los Angeles. My mother-in-law (77) went with us and got a great kick out of the trip. We left her in Los Angeles with relatives and then came north. The trip was highly enjoyable as we had never been West before, and the scenery on Route 66 and the inland route north was wonderful. To make a long story short, we arrived in Seattle with four gallons of gas and had averaged exactly 20 miles per gallon. To brag a little more, my five original tires are still on, after 40,000 miles! I had one recapped last week. I am now with Todd — Tacoma Shipbuilding Company — as assistant naval architect. As you know, this is the course I took up at the Institute in 1918. In spite of wartime inefficiency, which is not too great either, we are launching a baby flat-top every month or better, and they are not such babies either, being 550 feet long. They are all welded, Isherwood type (modified) ships, but have undergone a gradual evolution from the original tanker hulls with which they started. I expect to stay here until construction starts up again in New York. The natives all say that, if I stay through the summer, I'll never go back. The snow-capped Cascades and Olympics are a great sight, and Rainier is nothing to sneeze at. Bob [the Serra son] is somewhere in China, and says rice three times a day gets monotonous. My oldest daughter's husband is with Patton, and the second son-in-law is in the Navy. My youngest daughter is in Cornell."

The following is a clipping from the *Automotive News* of the Boston *Globe*, showing that another '09 man has made good: "Back in the early auto days . . . was a young [Technology] student, B. E. Hutchinson. His family resided in Pennsylvania. Among his ambitions was one to

be a reporter and he picked the *Globe*. Hutchinson proved a good reporter and after graduation went West. But he sensed there was a bigger future with the automobile industry. Today he is the financial genius who has aided in all deals down through the years. One of the most important was the purchase of the Dodge Brothers Company from Dillon, Read & Co. of New York, by Chrysler Corporation for \$170,000,000."

Kenneth J. Campbell, I, writes from Sioux Falls, S.D., as follows: "Last May while in Long Beach, Calif., working for Graham, Anderson, Probst and White, of Chicago, engineers and architects on the Navy Ammunition Depot project at Seal Beach, Calif., I was hospitalized with pneumonia for something like a month and have been taking life very easy ever since. My position with the above firm was engineer in charge of the mechanical engineering department. This was the third ammunition depot project with which I was privileged to contribute my bit towards the war effort. The two previous ones were in Nebraska, one for the Navy at Hastings and the other for the Army at Mead. A more worth-while contribution is that of two sons to the air service, the elder a lieutenant who has been in the European theater for about a year now, and a youngster still in the States. These fellows make us quite conscious that, as you stated, 'time marches along very quickly' over the 36 years since we graduated. Plans for the future are indefinite at this time. Prime consideration is being given towards something that will best get our boys going again when they get back into civilian clothes. It is possible we may return to California after V-Day if we can satisfactorily dispose of our properties here in the meantime. We might even take in a class reunion — if and when."

All of us have undoubtedly received the appeal to make our annual contribution to the Alumni Fund. Five dollars of what each of us gives goes for Alumni Association dues and expenses, covering our Review subscription; the remainder constitutes our actual gift to the Institute. Although the contributions per capita may not be large, last year the Institute realized \$95,000, equivalent to the income on a \$3,000,000 endowment. Unfortunately, our Class came far from meeting its quota (December Review), only 79 per cent being contributed. Let's be near the top this year when the final tabulation is published.

Note in the April Review, page 371, that Alumni Day will be June 23, but on account of the ruling of the Office of Defense Transportation the affair is local. We hope that a large number of class members can attend. The Review Secretary is scheduled to be away at that time, but he may be able to doctor his schedule so as to be present. — PAUL M. WISWALL, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries*: MAURICE R. SCHARFF, 3860 Rodman Street, Northwest, Washington 16, D.C.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

1910

The endeavors of Larry Hemmenway and Shorty Potter to stimulate interest in 1910

affairs in the New York area by having monthly luncheons delight me. Their report of these luncheons gives me the opportunity to mention in the class notes the names of those who find it difficult to write, or whose modesty forbids letters direct to me. Classmates attending the April luncheon included the following: Carroll Benton, Alfred Hague, John Lodge, Stuart Henderson, Arthur Stein, Raymond Jacoby, Ralph Preston, Harold Arnold, Dick Goodwin, Stuart Sneddon, John Cook, Harrison Flickinger, Gordon Holbrook, and Larry Hemmenway.

News from Van Court Warren has been received from various sources. Van has followed his profession of mining engineering, specializing in petroleum, and making his headquarters in Los Angeles and Auburn, Calif. In the latter location he is engaged in ore mining. During the summer of 1940 he was in southeastern Montana starting the development of gold placer ground when World War II gave him the urge to get into service. In January, 1941, he organized an engineer battalion and went into active duty on March 3. Because of his age he was taken out of active service, transferred to camp headquarters, and assigned to the building of a camp at Pismo Beach, Calif. He was then transferred to the Seattle Port of Embarkation in charge of engineer supplies. Van has now been sent overseas with the rank of lieutenant colonel in charge of the Solid Fuel Section with the Supreme Headquarters, Allied Expeditionary Forces.

Jack Babcock sent me the following clipping from the April issue of the *Railway Age* in regard to Barton Wheelwright: "Barton Wheelwright, chief engineer of the central region of the Canadian National at Toronto, Ont., has been appointed chief engineer for the entire system, with headquarters at Montreal, Que. Mr. Wheelwright, who was born at Minneapolis, Minn., on March 12, 1888, attended . . . Technology, and received his A.B. degree from Harvard University in 1910 and his M.E.E. degree from Harvard in 1911. He entered railroading in June, 1911, as a draftsman with the Grand Trunk at Toronto, Ont., and transferred to the signal department in April, 1912. After serving as assistant signal engineer from December, 1914, to June, 1916, he was appointed acting signal engineer. In October, 1917, he became engineer, maintenance of way, of the Grand Trunk lines in New England, and at the close of federal control he was named engineer-accountant to deal with matters pertaining to settlement between the corporation and the United States Railroad Administration. Mr. Wheelwright served as special engineer of the Canadian National from March, 1923, to January, 1928, when he became assistant to the chief engineer, and in July, 1936, he was appointed engineer, maintenance of way, of the central region. Three years later he was promoted to chief engineer, central region, the position he held at the time of his recent advancement to chief engineer."

The following is from the Newton, Mass., *Transcript*: "Colonel Henry Appleton Hale of 1800 Beacon St., Newton, who for the past two years and nine months has served in the Army Ground Forces, has been granted a terminal leave and will

revert to inactive status on July 22. Colonel Hale wears the European-African Middle-Eastern Theatre campaign ribbon with one Bronze Star and is a Commander of the Order of the Crown of Italy, an honorary title conferred by the Italian government." — HERBERT S. CLEVERDON, *Secretary*, 117 Grant Avenue, Newton Center 59, Mass.

1911

"Undoubtedly you have heard of the passing of Alfred V. de Forest, XIII. There was a great guy. He was always devising the most ingenious contraptions and then developing them until they worked in industry. Of course the best known was the one he called his 'bug-powder' (Magnaflux), but the rest, too, bore the stamp of the De Forest ingenuity. And for these he received many medals and citations — it's too bad no one ever gave him a medal for being a fascinating friend, unless his membership in the Newcomen Society was a recognition of his many-sidedness. Ask him about anything — farming, ancient musical instruments, psychiatry, sail boats, birds: he always knew his way about. He was a delight to the soul."

Mark Grossmann, III, director of research, Carnegie-Illinois Steel Corporation, Pittsburgh, Pa., wrote that tribute to our beloved classmate, who died suddenly at his summer home, Sky Farm, Marlboro, N.H., on April 5. An internationally known engineer and member of the Technology Faculty in the Department of Mechanical Engineering since 1934, "A. V." had been engaged for the past few years in important war research, but he invariably found time to attend our class dinners, held annually at Walker Memorial, and we shall miss him greatly. Probably best known in the engineering world for development of the Magnaflux test, a magnetic method for discovering defects in metals, he founded the Magnaflux Corporation and on three occasions was awarded medals for his work on the strength of machine parts and the relation between design, metallurgy, and the application of load in modern machinery.

From 1916 to 1918 he was an associate research engineer of the Union Metallic Cartridge Company, and from 1918 to 1928 he was research engineer of the American Chain Company. It was during this decade that he achieved an outstanding reputation as a consulting engineer specializing in the application of various tests and inspection methods to metals. In 1936 he was awarded the Longstreth medal of the Franklin Institute for inventions and meritorious improvements in machines and mechanical processes. In 1938 the Institute of Aeronautical Sciences awarded him the Sylvanus Albert Reed Award for the development of a method generally used by the aircraft industry for testing metals magnetically. In 1940 he received the Modern Pioneers' Award for "meritorious service to industries and to mankind in the creation of numerous new industries and countless jobs."

A native of New York City, he was prepared for Technology at Middlesex School, Concord, Mass., and his first engineering post was in the drafting department of the New London Ship and Engine Company, after which he became an instructor at Princeton, where he combined

teaching with advanced studies in metallography. He was a widely known yachtsman, and his yacht, the *Meta K.*, made many trips to Maine and Nova Scotia ports. He leaves his wife, a daughter, Judith B., and a son, Taber, to whom your Secretary promptly expressed heartfelt sympathy in their great bereavement. God rest his soul!

In the March issue of *Industry*, monthly publication of the Associated Industries of Massachusetts, is a most interesting, illustrated article, "Northeastern University's First Postwar Project." Our own Carl Ell, XI, President of this fine university located just beyond and across from Symphony Hall in Boston, stresses in this article the importance of immediate postwar construction of a \$1,000,000 Student Center in Northeastern's seven-building development plan, as well as expansion of college facilities for technical training to keep pace with the expanding emphasis on the courses co-operating with industry. Carl calls the proposed student center "a necessity, not a luxury." A few days after this article had appeared, I noted a statement by Carl that at this time one out of every eight students among the 845 undergraduates in the university's day colleges of engineering, business administration, and liberal arts is a veteran of the present war.

Through the good offices of Ted Van Tassel, X, a major, at present chief of reconditioning service at Camp Polk, La., I have learned news of two classmates, from whom I have heard nothing for years — Oliver D. Powell, XI, and Howard P. Ireland, XI. In a letter to Ted, O.D. writes: "Your letter addressed to me in Auburn, N.Y., has been forwarded here (353 West California Avenue, Glendale 3, Calif.), where I have been located for two years. I had long contemplated coming out here and finally made the break. Mrs. Powell's health has been much better here. I have been with Lockheed Aircraft since I arrived in California, as a manufacturing engineer on the final assembly line of the P-38 Lightnings. It may seem a far cry from shoes (Dunn and McCarthy Company) to flying ships, but I have enjoyed it. I hear from Howard Ireland, who is still with Dunn and McCarthy in Auburn, N.Y. He seems to keep busy. One of his sons is a paratrooper in Europe; one daughter is married to a doctor in the Navy, and the other to a sergeant, who has returned from two years or more in the South Pacific. Our son is a naval aviator, now instructing at Corpus Christi, Texas, and our daughter is a high school senior. Glendale is only 10 miles from Los Angeles and is a city of over 90,000. If you get out this way, be sure to look us up." In an accompanying note Ted said that his son Bill has recently been shipped overseas with his aircraft unit. Ted and Helen expect that their daughter Nancy, whose husband is flying in the Philippine theater, may join them in the near future.

We learn that Rufe Zimmerman, IX, United States Steel Vice-president in charge of research and located in New York City, is one of eight members of a committee appointed early this spring by Secretary of Commerce Wallace to make plans for a postwar program on national standards in co-operation with the Department of Commerce and the American Standards

Association, of which Zim is a past president. From the Alumni Office we have received word that Major Harold L. Robinson, I, is now back at 109 Morningside Road, Worcester, Mass.

First returns for 1911 in the current Alumni Fund V are encouraging, and all of you must remember that to stay on the Review mailing list you must subscribe to the Fund. So do! — ORVILLE B. DENISON, *Secretary*, Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford 55, Mass.

1912

Let's all give the Alumni Fund a boost this year, as the Class has not thus far distinguished itself either in numbers contributing or in amount contributed. Everyone can, I believe, contribute something, which would help to put us over the top. I know of no better way of insuring our future than by helping to educate our young men.

We are sorry indeed to note the death of George E. Robinson, IV, who passed away at Cambridge on January 16. George has long been prominent as an architect in Massachusetts. He leaves his wife, Gertrude B., and two sons, Corporal Ernest M., serving in France with the Army, and the Reverend Norman A. Robinson, pastor of the Shawnee Presbyterian Church, Shawnee-on-the-Delaware, Pa.

Carl Somers, IV, is back from two years and a half of engineering work with the Reclamation Service; his experiences were many and very interesting. — Paul M. Tyler, III, formerly regional eastern engineer of the United States Bureau of Mines at College Park, Md., has accepted a temporary assignment with the American Mining Congress. — A very interesting letter has come from Ralph M. Ferry, II, relative to his new assignment as manager of the Tennessee operations for the Aluminum Company of America. He asks any and all of you who are in the vicinity of Knoxville, Tenn., to look him up.

The following letter from Dwight Wyman was received before he was decorated for meritorious service and but shortly after his promotion to the rank of lieutenant commander: "Thanks for your felicitations on my promotion. I'll tell you a secret about that. It is exactly like being in school. If you're a good boy, you get promoted along with the rest of the class, and that's all there is to it. As for my 'doings' in the Navy," when I was in San Diego, I had a command of up to 1,200 men, training them to handle small boats, and keeping the boats in repair. The poor boats never got a rest — they always had green crews. After eight months in San Diego, where I went for my first duty, I left for the 'forward area.' Since then, my 'doings' have been about the same as those of hundreds of others. The Navy slogan about joining up to see the world has been well carried out in my case, although most of the world has been water. Out here, you can go for weeks with the nearest land some two or three thousand feet straight down. In many places, it is much farther down than that.

"I've ridden in planes, cruisers, destroyers, and landing ships for tanks, not to mention jeeps and alligator tanks. I've crossed the equator and the International Date Line, where it is Wednesday on one

side when it is Thursday on the other, and vice versa. Battle experience I have had in considerable variety, the last being at Guam, where our ships were right up close on D-day and for 10 days following. Before that, I was in a ship that was bombed by Jap planes, and, again, in a ship which missed by a scant few yards being hit by a torpedo from a Japanese torpedo plane. Some claim the fish actually went under us, but it's hard to tell. Part of the time I've been on the beach, living in grass huts, canvas tents, Quonset huts, and wooden shacks. In many places, there is no hot water, and the cold water is scarce. In one spot, leather picture frames and shoes mildewed while you were looking at them, and wrist-watch bands never lasted over six weeks, and a Chick Sales was palatial compared to what we enjoyed. There, in a nutshell (cocoanuts, by the way, are very abundant) is the answer to your letter. To elaborate would be to use up all the space in a couple of issues. I wouldn't be missing it all for the world, but I'll be glad when it's over, too. In closing, I'd like to add a plug for the young lads who are bearing the brunt of the hardships. They are doing a grand job, in all arms of the Service, and you folks back home will never know what they have been through. You may well be proud of them, whether they are your sons or somebody else's; and you don't need to 'worry about the younger generation.' — FREDERICK J. SHEPARD, Jr., Secretary, Murdock Webbing Company, Box 788, Pawtucket, R.I.

1914

It is your Secretary's sad duty to record here the death from a coronary occlusion on April 4 in New York City of Charles Ephraim Fox. His quiet, considerate, kindly manner won to him a host of friends during undergraduate days, as evidenced by his election as first marshal of the Class. These friendships strengthened as the years have passed. Charlie was prepared for Technology at the Roxbury Latin School and throughout his undergraduate years took an active part in class affairs as well as in athletics, where, in addition to participating in competitive sports, he held managerial positions. He was a member of Beta Theta Pi fraternity and of Osiris. On September 10, 1919, he married Kathryn H. Umstad. They have two children, a daughter Nancy and a son Charles, Jr., who is a staff sergeant serving in China. The family home was at Darien, Conn., although more recently winters had been spent in New York City. Tom Duffield, Chet Ober, and Ross Dickson attended the funeral, which was held in New York City.

A year after being graduated in Sanitary Engineering, Charlie joined the Rockefeller Typhus Commission to Serbia and later served with the American Red Cross Relief Commission in that country and other Balkan areas. He was the recipient of two Serbian decorations. In January of 1918 Charlie went up to Paris and was commissioned a first lieutenant in the Sanitary Corps. He was a member of the American Peace Commission and served at the Versailles Peace Conference as a translator of Serbian. He also served on the Coolidge Mission to Enemy Countries to gather political, economic, and industrial information, and later as a member of the

United States Food Administration Mission to Southeastern Europe. Returning to New York, Charlie established the Charles Fox Printing Company, of which he remained president up to his death. He was the publisher of each issue of our five-year reunion paper, "The Fourteen Pointer." His passing is a distinct shock and loss to all his classmates.

Fourteen men will be sorry to learn that our Assistant Secretary, Charlie Fiske, has been laid up for about a month. After confinement at his home, Charlie was moved to the Harkness Pavilion in New York City, where tests were being made to determine whether he was suffering from the effects of acute arthritis or rheumatic fever. Best of luck and a speedy recovery, Charles.

Another author has appeared in our ranks! Ernest Crocker has always been a voluminous writer of short articles, but this time it is a book — *Flavor*. McGraw-Hill is the publisher. An attractive folder describing this book says that it is the outgrowth of 23 years' work by Crocker in the laboratories of Arthur D. Little, Inc., on problems applying the senses of smell and taste to industrial products. And just to prove he is really a voluminous writer, here are four articles which have appeared lately: "Volatility in Food Flavor" in the March *Industrial and Engineering Chemistry* (Industrial Edition); "A Flavorist Views Food Processing" in the March *Food Industries*; "Basic Principles of Flavor Retention in Foods" in the 1944 *Proceedings of Food Technologists*; and "Retention of Flavor in Foods" in the *U. S. Egg and Poultry Magazine*. All this in one month. — Rupen Eksergian, who led the orchestra in our undergraduate days, but is now a consulting engineer of the Edw. G. Budd Manufacturing Company, has just been awarded the Louis E. Levy medal of the Franklin Institute for a paper entitled, "The Reaction of Fluids and Fluid Jets."

A pleasant visit recently was had with Howard Morrison, who keeps Lever Brothers' Cambridge plant in operation. Boggs reports that his oldest son is a captain in the anti-aircraft service and is stationed in the Marianas. His youngest son is in the push through Germany. — Ralph Wells, who has made South Pasadena his home for many years, has been very busy in connection with the California petroleum industry. Ralph's family consists of a wife and two daughters. — Dunc Shaw, President of the Reading Hardware Corporation, has put out a most attractive guide map on how to reach his home on the outskirts of Reading, Pa. He extends a cordial invitation to any classmate who expects to be passing through Reading to send for one.

Clarke Atwood continues to build empires. Not satisfied to supply us with hats and suits from milk (Aralac) and with a synthetic rubber (Arapol), his company has joined National Fireworks, Inc., to form the national Atlantic Research Associates, Inc. Clarke is president of the new organization and also was recently elected a director of Clark-Babbitt Industries of New York. The new research group will give especial attention to the development and production of chemurgic products. — Frank Somerby continues to be active in the Association of Private School Teachers, of which organization he is a past president. He also finds time to take a very active part

in the work of the Riverside Church of New York City, including being editor of one of their bulletins. Frank's oldest daughter, who is teaching at the Horace Mann School in New York, will receive her master's degree in education this June. — H. B. RICHMOND, Secretary, General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, Assistant Secretary, 1775 Broadway, New York 19, N.Y.

1915

Last minute final figures show that last year's Alumni Fund reached the splendid total of \$150,664. We made it at last! And you '15 men did nobly in contributing your share toward that. In this year's Fund 63 contributors (36 per cent) have given \$1,525 (52 per cent) for an average of \$24.50. Keep up the good work! What a guy is Jerry Coldwell! With a good check substantially raising his last year's ante, he writes, referring to my first Fund letter, "All right, you pest, your 33 is now 34." I'd be a pest any time for that.

Do you remember our attractive and vivacious young class baby, Virginia Thomas? She's so grown up now that she is a captain in the American Red Cross Field Service, in charge of a clubmobile, and has been traveling with the Eighth Air Force Base. She was in England all fall and in Scotland and France all spring, having some exciting times with the advancing Army. Her mother, Barbara Thomas, has written me this latest news: "Virginia crossed the Rhine on a pontoon bridge (made by our engineers), was first quartered beside a completely demolished, fairly well-known German town (with snipers going at it all day long!) but moved on and on, from one town to another, staying in a different one each night, in houses from which the Germans were just ordered out. She's with the Seventh Army, but the poor kid is now in an evacuation hospital (50 miles back) with, possibly, the mumps. I'm hoping it isn't her impacted wisdom tooth! She is heartsick about it. This is one of the times when I wish I could telephone her."

Our own Bill Smith, I, for some time a captain in the Navy, has recently been appointed a rear admiral. Congratulations to Bill for bringing this honor to our Class. — In Boston recently I had dinner on a pleasant evening with Parry Keller, who was in town. Except for graying and thinning hair, Parry has the same fine posture that characterized him as a standout officer in our undergraduate cadet days. He is manager of the development department for the Good-year Tire and Rubber Company, Inc., in Akron, and has been devoting all his time to war work in tire development for airplane tires, wheels, brakes, and rubber parts for tanks. His son, Parry, Jr., is in his sixth term as an engineer officer candidate in the Navy V-12 course at the Illinois Institute of Technology in Chicago (formerly the Armour Institute).

Having lunch one day not long ago with Sam Eisenberg, we met Carl Wood and had a talk about classmates and class affairs. The moot question of our 30th reunion has been answered for you by our general announcement. Not only do the restrictions of the Office of Defense Transportation and wartime conditions prevent our reunion but it seems hardly an apropos time for us

to celebrate when so many sons of classmates are in the service — when many have been wounded, a few captured, and one, I understand, killed in action.

Speed Swift pens the following: "The Class did well last year, no doubt because of your good work. . . . I seem to be normal these days, but am advised to omit intoxicating 'licker' from my diet. I don't understand this because hardly any of the 'licker' I ever drank seemed intoxicating to me. Perhaps it was to others. What to do with my stock on hand? No, never mind the suggestions. I guess I can find a way myself to dispose of it (if I must). . . . What is the latest dope on our 30th reunion, in view of the no-travel edicts from Washington? Perhaps we still can mark time until we get nearer to the June date?" Well, you can't keep a good man down. — San Willis wrote from the Fairgrounds Hotel, St. Louis: "So far as I know, I am still the only member of our Class in this area. That, incidentally, is evidence of the good sense of the Class as a whole. We have had every brand of weather in the almanac with plenty of smoke to boot. . . . Please keep me advised regarding plans for the 30th reunion. I intend to be there if it is humanly possible, but must plan ahead so that I can combine it with matters of business in the New York area."

In answer to my note, "Long time no see, no hear — how come?" Sam Berkowitz writes from Deep Lake Farm, Lakeville, Conn.: "The reason you haven't heard from me in a long time is that I have been very busy. My latest enterprise is the breeding of purebred Guernseys. Therefore, I have acquired a farm in Lakeville, Conn., of about 250 acres, with barn and tractors, milking machines, hay balers and farmers — and so forth and so forth. It has been quite a job getting it set up, and I hope to be spending most of my time there after the first of June. . . . I haven't been to Boston since I spoke to you last, and I have no plans for a trip in the future, as my business interests up there are going very smoothly, and quite a bit of the operation is being worked out of New York so that I have less occasion to travel your way. . . . By the way, I just became interested in a new show called *Round Trip*, which opens in New York at the end of May. I really shouldn't tell you about this until after its opening because if it's a flop, I would rather have kept it a secret — but it looks as if it has a very good chance, so if the papers give it any kind of a write-up, I hope you will take the opportunity to see it on your frequent visits to New York. . . . If, in your travels through New England, you get anywhere near my part of the country, I wish you would drop down to see this farm of mine. It's really a very interesting enterprise. . . . Talking about shows, my first is still running in London, and it is one of the dramatic hits of the season this year. These things go on and on if they're any good. Most of them flop."

From 2269 Canyon Drive, Hollywood 28, Calif. (of course), Ken Kahn writes: "Have you a list of the members of our Class who are in this district? If so, I'd like to have it to do a little inquiring about a 30th reunion of the local '15 men. There must be quite a number here now. I know some, but it would be nice to have an up-to-date list." I have sent him the list and wish those

boys the best of luck for any kind of local get-together they may be able to have.

There is no substitute for our 30th reunion. Max Woythaler and Weare Howlett made the arrangements for that delightful 25th reunion at Oyster Harbors Club and worked hard and long on trying to arrange a 30th at the same place. Their final committee report called it all off. We shall have a regular class dinner in Boston which in no way will be meant to replace the reunion, and in the fall we shall have a similar dinner in New York. Perhaps the 31st or 32d reunion will find us all far more assured of peaceful world conditions and we can enter into the spirit of things convivial.

From the Hartford, Conn., *Times* of February 23 we hear of the honor accorded Stanley Osborn: "Trinity College honored both itself and Connecticut's State Commissioner of Health, when it conferred the honorary degree of doctor of public health on Dr. Stanley Hart Osborn. The people of this State have long come to know Commissioner Osborn as a progressive, well-informed public health officer, firm in the enforcement of health statutes and efficient in the administration of his department. Large credit is due him for conditions which do not readily spring to public attention — the result of preventive work in which he has taken a forceful part since becoming commissioner. The absence of epidemics is not accidental even if one is not always able to point to specific acts and policies which have prevented the spreading of disease in any given situation. The cumulative effect of the type of leadership which Dr. Osborn has demonstrated in the matter of public health has been vigorously on the side of unrelenting battle against the first invasions of the contagious enemy. In recognizing his services, Trinity College has creditably expressed widespread sentiment in this State in bestowing a deserved tribute upon a highly competent public servant." Stanley himself writes: "The honorary degree was awarded at Trinity's 120th commencement, after I had addressed the graduating class. How time flies! I have been commissioner of health in Connecticut since 1922. My son, Stanley, Jr., is now in an antitank company with the Seventh Army. Another son, Henry H., has just been inducted after having finished his first term at the Tufts College engineering school, where he made the honor list. Since he could not have entered Technology until February, he put in a term at Tufts, beginning last September."

We shall welcome your contribution to the Alumni Fund. Please "help Azel." — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

1916

A dredge named for the late James F. C. Hyde, I, a brigadier general in the Corps of Engineers, was recently launched at Wilmington, Del. The last of four built by the Dravo Corporation for the War Department, the vessel was sponsored by General Hyde's widow, who now resides in Washington, D.C. General Hyde died on last August 7, of a heart attack. He was born in Newton Highlands and was the son of the first mayor of Newton, James L. C. Hyde.

J. W. Barker has for some years been on

leave of absence as dean of engineering of Columbia University to serve as special assistant to the Secretary of the Navy. In this capacity he has been a prime mover in the V-12 and many other Navy training programs. Dean Barker, who will continue on leave from Columbia, is now going on "intermittent" duty in the Office of the Secretary of the Navy in order to devote three or four days per week to the posts of chairman of the executive committee and acting president of the Research Corporation, with offices on the 38th floor of the Chrysler Building in New York. — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Berke-Moore Company, Inc., 11 Boylston Street, Brookline 46, Mass.

1917

A report has come in as these notes are being written that Albert F. Hegenberger, a brigadier general in the Air Forces, has been awarded the Legion of Merit. — Penn Brooks arrived safely in China about March 1 and, in his characteristic way, is already hard at work for the War Production Board on Chinese industrial production problems. — According to an announcement of Eastman Kodak Company, following the retirement on March 1 of H. T. Seaman, a revision has been made in their sales department. L. L. McGrady has been named acting manager of the new cellulose products sales division, which will handle the sale of Kodapak, Kodaloid, Eastman Acetate Sheeting, and Lacquer bases.

Ras Senter writes: "I am working hard on production and other problems — mostly war regulations and restrictions — in connection with the operation of my Louisiana oil properties. Some day, when the world settles down to normal again and we have more time for doing the things we should like to do, I am going to run up to Cambridge and say hello." Ras also sends us a clipping of an Associated Press dispatch, dated March 14 at Manila, in regard to Bill Sullivan. It runs in part as follows: "One of the Navy's foremost salvage experts said today that the tonnage of sunken ships in Manila's wrecked and clogged harbor is far greater than in any other port in the war and the clearing will present a stupendous problem. Commodore Sullivan, who came from salvage operations in European ports to direct the opening of war ravaged Manila's harbor to shipping, estimated at a press conference that more than 300 ships were sunk here. He estimated that the sunken tonnage at Manila is three times that of Cherbourg. He said he could not hazard a guess on the time required for the gigantic task but he expects within a few days to raise one of the six ships the Japanese sank to blockade the main harbor channel through the breakwater."

It is with great regret that we must report two deaths: that of Samuel Sewall on February 27 in Minneapolis, Minn., and that of Edgar S. Gorrell on March 5 in Washington. Sewall had been treasurer of the Minneapolis Iron Store. In World War I he served as a first lieutenant in the Signal Corps in the division of research and inspection. For a time he was detailed to work with the French Bureau of Inventions in the Sorbonne. Colonel Gorrell, President

of the Air Transport Association since 1936, was chief of staff of the A.E.F. Air Service in World War I. Resigning from the Army in 1920, he became associated with Nurdyke and Marmon and later, from 1929 to 1935, was president of the Stutz Motor Car Company. — **RAYMOND STEVENS**, *Secretary*, 30 Memorial Drive, Cambridge 42, Mass. **PHILIP E. HULBURD**, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

1918

News is very scarce this month. On April 3 Virginia Vaughan Tavener, daughter of our classmate, Charles H. Tavener, was married to James W. Niemeyer, a pharmacist's mate, second class, in the Navy. The wedding took place in St. Paul's Episcopal Church, Riverside, Conn., and was followed by a reception at the home of the bride's parents. Pete Sanger and his family and I represented the Class on this occasion. — **GRETCHEN A. PALMER**, *Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

Al Richards called on your Secretary on April 23, and Bill Banks was in on April 24. Myles F. Connors of 129 Meadbrook Road, Garden City, N.Y., dropped a note thanking the 25-year book committee for all the work required to prepare it for publication. Rod Bent of S. Bent and Brothers, Inc., manufacturers of chairs and tables, Station A, Gardner, Mass., dropped a note regarding the 25-year book; so also did Roy Burbank, who says, "The preparation of the book was quite an undertaking, particularly under present conditions. You should have special commendation for it." Dick Cashin, Westboyd Chemical Company, Inc., Chicago, Ill., states, "Our Class certainly owes you a debt of gratitude for the work you have done in our behalf in preparing the 25-year book." Paul Blye sends "compliments on the swell job you are doing on the 25-year book." Don Way, Russell Palmer, John Stevens, Edward A. Richardson, Edward G. Moody (whose address has been changed to 82 Scituate Street, Arlington, Mass.), Webb C. Patterson, John F. Lavagnino, D. K. Webster, M. H. Role, Ev Doten, M. P. Berk, D. Arthur Lundquist, Benjamin H. Bristol, Hy Selya, Fred Hunter, Larry Riegel, Edward E. Scofield, and George Michelson all sent in notes in regard to the 25-year book. Chuck Drew writes to say, "Thanks again, Gene, for all your good work."

Jimmy Reis writes: "It has been quite a while since I have heard from you except through the class notes in The Review, which I enjoy very much. I was sorry not to be able to get back for the big 25th as it must have been an unusually enjoyable affair. Sometime after the current unpleasantness in Europe and Asia is over, I hope once more to be able to move around again. As for myself, there is nothing new or startling that I can add for the notes. I am still at Northrop turning out the much needed Black Widows, and while some companies are slowing down their output, we are stepping ours up. My work there is still the same, and I have charge of the laboratory testing materials and processes. It is pretty much routine, but every once in a while something new and interesting

turns up. I suppose that you still get around the country as much as ever; so if you're ever out in the Los Angeles area, don't fail to look us up. At present, I am down here in the desert getting thoroughly warmed up and taking the rest that both my wife and I so much need. We shall be here only until Friday, and then back once more to the grind."

Maurice H. Role writes, "I am still as busy as I was when I last saw you in June, as electrical consultant for Keystone Manufacturing Company, and in my regular electrical construction business." — **Bernard S. Coleman** writes from his new address in Denver, "'Life can be beautiful,' and so it is in these wide open spaces. Denver is a grand city, and there's a swell bunch of Tech men here." — **Mason S. Noyes** writes, "Your card received just in time for me to be able to tell you that after 13 years with the Bureau of Ships (I originally began in the Bureau of Engineering) of the Navy Department at Washington, D.C., I have just commenced a new adventure as assistant chief engineer of the Lunkenheimer Company of Cincinnati, Ohio. There are one or two more Tech men connected with this company."

Tim Shea returns in June to the Western Electric Company in the capacity of superintendent of manufacturing engineering, completing a most vigorous, interesting, and useful period for him in the war effort. On April 9, Tim, as director of research for Columbia University Division of War Research, was given a testimonial dinner at the Norwich Inn. Vannevar Bush '16, director of the Office of Scientific Research and Development, Washington, D.C., served as toastmaster. Rear Admiral Julius A. Furer '05, co-ordinator of research and development, Office of the Secretary of the Navy, John T. Tate, chairman of the submarine warfare divisions of the National Defense Research Committee, George B. Pegram, dean of the graduate school at Columbia University and chairman of the Columbia University division of war research, and Dr. Bush presented the testimonials. Mr. Shea is serving in his present capacity on leave of absence as chief engineer of the electric research products division of the Western Electric Company. Model submarines and a gold watch were presented Mr. Shea. The dinner also marked the completion of four years of war research by the Columbia University division of war research. — **Howard H. Searles**, of 27 Norwood Street, Marlborough, Mass., has been heard from. J. Herbert Gould, Jr., has moved from Rochester, Mass., to Hama-rock, Mass. (P.O. Box 45). Victor N. Samoyloff's present address is in care of Mrs. Lord, 629 West 135th Street, New York, N.Y. — **EUGENE R. SMOLEY**, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York, N.Y. **ALAN G. RICHARDS**, *Assistant Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

1920

Herewith is a preliminary report on the response to my letter of April 6 issued to the entire Class. At this writing, two weeks after the letter was sent out, I regret to report that the response to my appeal for a reply and a modest contribution for postage, etc., has not been exactly overwhelm-

ing. I have received an even dozen letters, about 3 per cent return, which is all right for advertising but not very good for the Class of 1920. I must say, however, that those who did write me gave a very heartening response and were most generous in their financial contributions; so I am not ready to conclude that the Class is dead yet. If you didn't get the letter, will you please let me know, so that I can check up on our Class mailing list.

The dozen who have been heard from deserve honorable mention, and I take this means of thanking them for their interest and contribution. Old stand-bys like Norrie Abbott, Ed Ryer, Al Glassett, and Scotty Wells came through promptly, as expected. Al writes that he is sure the crowd in New York will want to get together, perhaps at the same time we have our Boston gathering, and those of you in or near New York will hear from Al or me as to arrangements in due course. Ed Farrow expects to be around at the time of our Boston get-together and writes, "I think it is a very good idea to continue plans to hold a class reunion regardless of month or year as soon as suitable arrangements can be made." Pete Ash writes, "As you know, I have been one of those birds that never got back to a reunion, but I am sincerely looking forward to the next and hope I can get there." Pete's address is 533 West 57th Street, New York. Johnny Philbrick writes, "Having been completely remiss in my attendance at other reunions, I had been hoping that Hitler would give up in time for me to attend a big gathering for our 25th milestone. As long as this cannot be, I am anxious to get some word of the habits and whereabouts of the old gang." (Please note, Al, that Johnny wants to know about any local meetings in either New York or Philadelphia.) Johnny is president of the Giant Portland Cement Company, Pennsylvania Building, Philadelphia. Judd Dean says he'll be with us at our local meeting and "it will be interesting to count the bald heads and gray pates that have appeared in the past 25 years." Judd is with the Cape Ann Tool Company, Pigeon Cove, Mass. Carl Rowen likewise is counting on the local meeting, and he certainly ought to be on deck as he is living in Swampscott; address, 90 Mountwood Road.

Lee Thomas writes, "Your appeal is so eloquent that I do not see how anyone can refrain from writing you his regrets that we cannot all get together this spring. (How I wish this reaction were unanimous!) I have been almost out of touch with anyone from 1920. For a while Carleton Alexander was stationed in Cincinnati, and K. B. White did his efficient engineering in this direction. I have talked to Robillard over the telephone a few times and have seen Dusty Miller out in Phoenix. He is a very hospitable guy and was responsible for making my stay there pleasant. I am connected with Economy Pumps, Inc., also with Liberty Planer. Both operate under the same roof in Hamilton, Ohio. I am living at 765 Ivy Avenue, Glendale. If you can find any other bachelors in the Class (Al, please note), maybe we can have one of those conventions of less than 50." M. S. Sanders, VI, says that he has never gotten back before, and he will make a special effort to be there at the big 25th. Sanders has been around since he left the

Institute. First he was with American Telephone and Telegraph Company, then with a contracting firm in Bristol, Va.; in 1933 he acquired an M.S. degree at the engineering school of Columbia University. After that he was a consulting engineer for several years with headquarters in Wytheville, Va. Then he went with Hercules Powder Company to construct several government munition plants; and now he is research associate at the School of Mines, Columbia University. He is living at the King's Crown Hotel, 420 West 116th Street, New York. Fred Brooks has been with the University of California's Agricultural Experiment Station at Davis, Calif. He is an agricultural research engineer, specializing in heat transfer out of doors, service climatology, frost protection, and aerodynamics of pest control. During the war he has been active with the National Defense Research Committee and Chemical Warfare Service at Dugway Proving Ground, Utah, and recently he was at the Woods Hole Oceanographic Institute and with the Navy for research at sea.

This completes the list of those heard from, and I earnestly hope that I can report on many more in the next month's Review. As a result of the letter, I did receive the sad news that Meylert Bruner had passed away on January 28. I have written for further information on Gus's death and will give you the news when it is received.

Louis Bender, who was a colonel stationed at Topeka, Kansas, has returned to civilian life and is in Baltimore; address, 703 St. Johns Road. Captain Ray Collier has left Washington and is in San Francisco, or at least that is his present mail address, 1265 Washington Street. Captain Harry Kahn's address is Headquarters, 52nd Medium Port, A.P.O. 562, in care of Postmaster, New York. Charles J. Lawson is at Officers Quarters 516 B, Wright Field, Dayton, Ohio. He has been promoted from lieutenant colonel to colonel. John Perkins has left Maine and is in New Britain, Conn.; address, 37 Russell Street. Wendell Sammet is a lieutenant colonel now stationed in Brooklyn, N.Y., at 1049 58th Street. Bob Warriner is in West Springfield, Mass., at 144 Ohio Avenue. W. Kenyon Lloyd is assistant general counsel of the Maryland Casualty Company in Baltimore. He served for a time in the Army Air Forces and was a major when he left to return to his company, where he has been located since 1924. This will correct an error in the January notes in which I referred to him as with the American Casualty Company. — HAROLD BUGBEE, *Secretary*, 7 Dartmouth Street, Winchester, Mass.

1921

Letters from you fellows have hit an all-time low. A personal note from Eliot Underhill, X, of San Francisco, where postwar security has real significance, is our only anchor to windward. We've fallen to wondering whether you'll write at all after reconverting to normalcy. A letter a year from each of you would set us up in literary prosperity and help promote that 1946 Class Book for our 25th reunion. Start writing!

Eliot, by the way, is the latest to report membership in the select circle including the Bardes-Conant-Gardner-Hawes-Pelkus-

Waterman-Zoller family groups. He has belatedly announced the arrival of Michael Underhill 17 months ago as a Christmas present to five-year-old brother Dick. The Underhills make their home at 3363 Washington Street, San Francisco 18. Eliot, who is on a special assignment for the Snyder Engineering Corporation, played host at a luncheon of the M.I.T. Club of Northern California and then qualified as an expert in guiding us around San Francisco. Decker G. McAllister, VI, Vice-president of the Pacific Scientific Company, was unable to attend the luncheon, and we had to track him down to his attractive office at 25 Stillman Street. Deck has a live-wire organization all along the Pacific Coast handling aircraft and industrial instruments, commercial refrigeration and air conditioning, physical testing equipment and George Chutter's heat-treating apparatus. Lee J. Purnell, VI, whose home is in Berkeley, Calif., has been in Washington, D.C., for several years putting in his time on a special engineering education assignment.

The Los Angeles contingent scurries around in such a typical Southern California dither that it is impossible to catch any one of them. Ed Chilcott, VI-A, is president of Technical Products Company, with offices in Hollywood and a good-looking plant near El Segundo. Art Raymond, XVI, is vice-president of Douglas Aircraft and a neighbor of some New Jersey friends of ours, who couldn't fix his whereabouts either within the Los Angeles city limits or by consulting the alternate work of reference, a globe of the world. Ed Ragatz, II, is assistant manager of research and development for the Union Oil Company of California. Archie Mock, XIII, and Jack Kendall, XV, have deserted the area. The former left no trail to track down, and the latter has gone to Salt Lake City, where he is manager of the Bekins Van Lines.

Walt Church, IV, and Glenn Stanton, IV, uphold architectural honors in Portland, Ore., where both are located in the Railway Exchange Building. Glenn heads his own organization, and Walt is a member of the firm of Whitehouse, Church, Newberry and Roehr. Art Brambach, XV, continues as branch manager for International Business Machines Corporation in Seattle, Wash., and is one of the outstanding boosters for the Pacific Northwest. Elliott B. Roberts, I, a lieutenant commander in the Coast Guard, was in process of moving his family to Washington, D.C., after all these years on the Coast. He is with the Coast and Geodetic Survey.

S. Murray Jones, VI, has resigned from the wartime assignment with the Office of Scientific Research and Development and is now with Jackson and Moreland in Boston. He has moved his family from Scarsdale, N.Y., and makes his new home at 18 Bonnybrook Road, Waban, Mass. Howard LeFevre, III, of the United States Smelting, Refining and Mining Company, New York, has finally given up the famous Norwood, Mass., residence, and he and his mother make their home at the Palmer House, Larchmont Acres, Larchmont, N.Y. New addresses are reported for Lansing T. Carpenter, XV, at 5 Putnam Road, Scarsdale, N.Y., and Orrin Champlain, Jr., III, at Old Lyme, Conn.

Last year's Fund total hit the jackpot.

This year's is open, and we're all betting early. Are you in? — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Corporation, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Federal Telephone and Radio Corporation, 591 Broad Street, Newark 1, N.J.

1923

Ray Bond is taking an extensive trip and will be out of circulation for several months. Consequently, you will have to put up with notes from your new Assistant Secretary. — Ernest A. Davis writes from Stamford, Conn., notifying us that he has been promoted to the position of executive vice-president of the Pitney-Bowes Postage Meter Company of that city. He will assist in an administrative capacity at coordinating and extending company manuals. We expect to note a rise in our postage meter bill in the near future. — Harry Green has retired, after three years of service, from his advisory post with the Metals Reserve Company and is returning to his work as treasurer of Brandeis, Goldschmidt and Company in New York City. — The new addresses of class members indicate that the Assistant Secretary has passed within inches of some of you in his travels around the country during the last few months. He will try to make some visits or telephone calls in the future. Many address changes are due to the war effort or to service in the armed forces. The Class is well represented both by uniforms and by production engineers. — Launcelot W. Hanson and his charming wife invited the Assistant Secretary to dinner in San Francisco last December. They have a splendid home in Berkeley and a fine son and daughter. — If members of the Class in and about New York will send the Assistant Secretary items of interest, they will be included in the next issue of the class notes. Drop in for lunch when you can. The telephone number is Whitehall 3-9790. — HORATIO L. BOND, *Secretary*, 457 Washington Street, Braintree 84, Mass. HOWARD F. RUSSELL, *Assistant Secretary*, Improved Risk Mutuals, 60 John Street, New York 7, N.Y.

1925

These notes, which you will read a few days before Alumni Day, will serve as a reminder of something you will already have learned through reading the general section of The Review, namely, that the observances this year, in deference to regulations of the Office of Defense Transportation will be strictly local in character, and that invitations will have been mailed only to those Alumni who live in the Boston Postal District. The foregoing will apply to class observances also, including our own. Looking into the future, it is possible that when conditions permit, we shall have a special reunion, without waiting for the usual five years, to take the place of this one, which was perforce "nipped in the bud."

Your Secretary was recently transferred from the position of wage control manager of the Western Cartridge Company to that of assistant to the personnel director of Olin Industries, Inc., of which Western is a division. One of the first results of this change was a trip to Pittsburgh, providing an opportunity to renew acquaintance with two class members whom I had not seen

for over 16 years. The first of these was Charlie Boardman, XV, whom I had last seen early in 1929 when in the employ of the United States Chain and Forging Company (now the McKay Company). Charlie is still with the Duquesne Light Company and is one of their sales engineers. Lately, he was appointed honorary secretary of the Alumni Association for Western Pennsylvania and as such will have the duty and pleasure of guiding prospective students to the halls of M.I.T.

The other old friend was Rufus N. Palmer, XIV, who is an industrial fellow of the Mellon Institute of Industrial Research. Rufe went back to the Institute and received his Sc.D. in Course XIX in 1938, shortly thereafter becoming connected with Mellon Institute. He took me on a tour through a number of the laboratories and public rooms of the institute, which has a very thorough and diversified setup. Rufe himself is working on a problem in the manufacture of pearl buttons from freshwater mussel shells. This is an indication of the variety of work handled at Mellon, ranging all the way from the development of completely new technologies to the re-vamping and improvement of very old ones.

I am looking forward to further trips on which old acquaintances may similarly be renewed, as my employer has plants in Connecticut and Washington and at a number of places between — to coin a phrase, "from coast to coast!" — **HOLLIS F. WARE**, *General Secretary*, P.O. Box 52, Godfrey, Ill. **F. LEROY FOSTER**, *Assistant Secretary*, Room 5-105, M.I.T., Cambridge 39, Mass.

1926

A welcome letter is at hand from Charlie McCulloch, who reports that he is still with the Foster-Wheeler Corporation as manager of the petroleum refinery division. This means that he has had an important responsibility in the aviation gasoline program. His home is in Westfield, N.J.

Dave Sutter of Detroit reports that at the March meeting of the Detroit Technology Association, John Campbell '25, who is well known to members of our Class, was the guest speaker, his subject being "Interesting Developments in Gas Turbine Engineering." John Longyear and Dave have both been active in the affairs of the Detroit Technology Association for some time. — **JAMES R. KILLIAN, JR.**, *General Secretary*, Room 3-208, M.I.T., Cambridge 39, Mass.

1927

This month's newsmag contains only one item: G. Francis Bowles has checked in from 256 Navy Road, Building 23, Section C, San Francisco, Calif. He is a marine engineer at Hunters Point Naval Drydocks, concentrating on machinery and piping work.

New address department: Lieutenant Oliver E. Becker, Headquarters 68th Group AACs, A.P.O. 565, care of Postmaster, San Francisco, Calif.; George W. Brady, 41 Elston Road, Upper Montclair, N.J.; Lieutenant Walker K. Johnson, 0-241187 Squadron CA 316th AAFBU, MacDill Field, Tampa, Fla.; Walter Seligman, 14 de Julio 1641, Buenos Aires, Argentina; Lieutenant Commander John T. Shilling-

ford, Luneta Drive, Del Mar, Calif. — **JOSEPH S. HARRIS**, *General Secretary*, Shell Oil Company, Inc., 50 West 50th Street, New York, N.Y. **DWIGHT C. ARNOLD**, *Assistant Secretary*, Stevens-Arnold Company, Inc., 22 Elkins Street, South Boston 27, Mass.

1930

June 23 is the date to remember this month! Alumni Day will be celebrated on that day in Cambridge and Boston, and our Class will hold its 15th reunion in Boston and in other sections of the country and wide world where two or three 1930 men can get together. The Greater Boston gang will have lunch at some golf club near Boston; those who wish to do so may play a round of golf in the afternoon while the rest of the boys are — reminiscing. Then we'll all attend the Alumni Day "Stein-On-The-Table" Dinner at the Hotel Statler in the evening. Plan to be with us if you live around Boston, or if business brings you to the city that week. If that's impossible, why not call up a couple of classmates and arrange an informal celebration of your own? We'll be glad to write up the several reunions in the fall if you will tell us who was there and a bit of what happened.

Lud Jandris is a captain with the Army in Europe. His wife and two-year-old daughter make their home in Gardner, Mass. Bill Cullinan has been appointed state airport engineer for the State of New York. Elmer Goodale is with N.B.C. in New York City. Art McCullough has come to the Newark branch of the American Steel Castings Company. He was formerly located in Munster, Ind. — The midwinter Alumni meeting in Cambridge in February brought forth eight 1930 men: Scotty, Jack Latham, Joe Anastasi, George Shrigley, Bob McCarron, Dan Lucey, Howie Gardner, and Ed Mears. Your Secretary was away on a business trip, but Jack took over and sounded out the boys on the coming 15th reunion. — Remember, the Alumni Fund campaign is now in full swing. Let's celebrate our 15 years of membership in the Alumni Association by making 1930 the class to beat in the campaign! — **PARKER H. STARRATT**, *General Secretary*, 1 Bradley Park Drive, Hingham, Mass.

1932

After an absence of several months from these columns we have the sad duty of reporting that our classmate, Leland M. Burr, Jr., a lieutenant commander in the Navy, was killed in action. When I read the following extracts from a letter written to Mrs. Burr by Captain Harold J. Wright, I felt proud, and I know you will. "It is with the deepest sympathy that I write these lines. I know there is nothing I can do to ease your sense of loss, but I feel that you should know some of the circumstances under which Lee so gallantly gave his life for his country. The manner of it was such that you and your children and all of Lee's friends will be forever proud of him. On January 8, the morning before we went into assault on Lingayen Gulf, we came under enemy air attack. The ship's bridge was hit by a Japanese plane, which caused an intense fire and considerable damage. Some men were trapped in an ammunition storage compartment which was part of the bridge structure. Although Lee had suffered burns

himself, he twice went into this compartment, which was on fire and in which ammunition was exploding, and rescued enlisted men. Even after that Lee tried to remain on the bridge to help — in fact his sense of duty and self-forgetfulness were so strong I actually had to order that he be taken below to sick bay. The additional injuries he received while rescuing his men were too much even for his stout heart, and he passed away two days later. He was conscious to the last and in no pain. He was buried at sea, in accordance with Navy custom and orders, off the coast of Luzon. I have sent to the Navy Department an account of Lee's splendid heroism with a recommendation for the award of the Congressional Medal of Honor. What action the Department will take I cannot predict, but there isn't an officer or man in the ship who doesn't feel that Lee was more than worthy of the highest mark of recognition that our country can bestow."

John Finnerty, now a major, has been assigned to the Third Service Command headquarters in Baltimore for duty with the prisoner of war branch. John entered active duty with the Army in April, 1942, leaving his job as chief field engineer with the Herman Nelson Coporation at Moline, Ill. He was previously stationed with the Army Specialized Training unit at the University of Pittsburgh. — **ARTHUR M. MARSHALL**, working as a transportation engineer, has announced the opening of a Boston office at 11 Beacon Street. — **WILLIAM P. LIBBY, JR.**, who has been with the New Haven railroad since graduation, has been appointed office assistant to the Vice-president, Robert Pearson. — **JOHN W. FLATLEY** has been promoted by the Treasury Department from chief of the contract and purchase branch in the Washington Office of Procurement to director of Region I at Boston. He began his career with the Division as a purchasing officer.

Secretary Locke '96 has sent us the following interesting item: "I have received a letter from Arthur Moy, who, as a student, was Arthur Mei Orne. He wrote from China, where he is a lieutenant in our Army. He spoke of the difficulties of getting mail and supplies over the so-called 'Hump.' Planes do come down over those high mountains, and when they do, the whole cargo is lost, since the crew consider themselves lucky if they can find their own way down the mountains to safety, which they often fail to do. The unknown heroes in that theater are those pilots and crews who daily fly so treacherous a route. That slender air supply line is all that is available, and those airmen brave all sorts of weather to keep China supplied with the bare military necessities. Moy had been in China more than a year. When he first arrived, he spent much time in the field and did considerable traveling. More recently he has been put on a desk job and is kept mighty busy. In consequence, however, of being stabilized at one spot, he was married in September to his fiancée of over three years' standing. At the time he wrote, she had gone back to her job of teaching and would not rejoin Moy until the spring. He reports that he has met many former Technology students in China who have been back in China for 20 years or more and are keenly interested in hearing about latest developments at the Institute."

Howard M. Quigley is superintendent of the Kansas State School for the Deaf in Olathe, Kansas. His interest and work in Rotary International has led to his serving as a district governor for the current year. — Donald K. Morgan, a lieutenant, and Vivian Ruth Graves, an ensign, were married in March. He is stationed at the Naval Ordnance Laboratory in the Navy Yard at Washington, D.C. She is in the Bureau of Yards and Docks. — CLARENCE M. CHASE, Jr., *General Secretary*, 1207 West 7th Street, Plainfield, N. J. *Assistant Secretaries*: CARROL L. WILSON, 1530 P Street, Northwest, Washington, D.C.; WILLIAM A. KIRKPATRICK, Allied Paper Mills, Kalamazoo, Mich.

1934

It is with deep regret that we announce the passing of Harold C. McKay, Jr., on March 4 at Bridgeport, Conn. For the past 10 years he had been chief metallurgist at the Fairfield, Conn., plant of the Aluminum Company of America. He leaves his wife, Marjorie, and two children, Sara Lou, four, and Malcolm Cole, five months. Details on the cause of his death have not been ascertained.

Sayward Farnum has made notable progress since the beginning of the war. He went into the Army as a private and was recently promoted to the rank of lieutenant colonel in command of an anti-aircraft battalion. The insignia of the battalion is a silhouette of the stout Mr. Five-by-Five. Perhaps some of you remember that in 1931 Sayward won the Golden Gloves heavyweight championship in New York. It looks as though he were a 100 per cent fighting man. — Maxwell Millard was promoted in October to the rank of lieutenant commander in the Naval Reserve. He continues his assignment to a battleship somewhere in the Pacific area.

George R. McCaulley, a lieutenant colonel in the Corps of Engineers, was promoted from the rank of major on January 25. Colonel McCaulley is now serving as executive officer to the division engineer, South Atlantic Division, Corps of Engineers, in Atlanta, Ga. In that capacity he assists and advises the division engineer in the supervision of construction and maintenance of all Army installations within the Fourth Service Command. The division engineer is also charged with the procurement of engineer supplies for use by combat troops throughout the world and operates engineer depots in the South Atlantic and Gulf States where these supplies are received, stored, and issued. From 1937 through 1940, Colonel McCaulley was assistant professor of structural design at Kansas State College, after which he was professor of the same subject at Cornell University until June, 1941. He was structural design engineer for the Stone and Webster construction corporation of Boston from July, 1941, until his entrance into active duty as a second lieutenant in October, 1941. Colonel McCaulley entered upon active duty with the Fourth Zone Construction Quartermaster in Atlanta, Ga. On December 16, 1941, when all military construction was transferred to the Corps of Engineers, he was assigned to the Atlanta Engineer District, and on August 17, 1942, was transferred to the South Atlantic Division Office as assistant executive officer.

He became executive officer on September 16, 1944. — JOHN G. CALLAN, Jr., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, 169-49 24th Avenue, Flushing, N.Y.

1937

The following is taken from a letter received from Charles R. Kahn, Jr., a lieutenant in the Navy: "This will probably sound like a personal history lesson, but inasmuch as The Review and I haven't got together other than at scattered points, since about 1939, I might as well sketch the outline. Up to the fall of 1941 I was working in and around New York City for various air conditioning firms. In November of that year the Navy and I became acquainted when it risked a commission and sent me to Philadelphia Navy Yard as a machinery superintendent. About a year later — in March of 1943, to be exact — I was sent to practice French in the guise of a repair officer in and about North Africa and the Mediterranean in general, eventually winding up with the staff in the company of another Tech man, Sam Janney '31, in the logistics end of affairs. After a pleasant interlude of swimming, sun-bathing, and so forth, in Corsica, along with an incidental invasion of Southern France, I was shipped back to the States for about two months and then on to join the company of my present ship. She was in much of the previous campaigning but I only got aboard in time for the Lingayen Gulf affair, which firmly convinced me I'd arrived too soon. Subsequently, my affections have been torn between my ship and the lady I married on February 25, Estella Huni of New York, who will be in the city while I plow the deep some more and see about getting additional news for The Review. As it's arriving regularly now and I always look for '37 notes, let's get some bigger and better ones."

We have an announcement of the engagement of Lorraine Ness to Martin Kuban, Jr. The wedding will probably take place sometime this spring. — WINTHROP A. JOHNS, *General Secretary*, 34 Mali Drive, North Plainfield, N.J. PHILIP H. PETERS, *Assistant Secretary*, 159 Glen Road, Wellesley Farms 82, Mass.

1939

A press release bringing news of Charlie McKinnon states that Captain McKinnon has been in the Mediterranean theater of operations for 27 months. He is now commanding the headquarters squadron of an Air Service group, serving with the Twelfth Army Air Force Service Command, supply branch for the Mediterranean Allied Air Forces in Italy. Before becoming commanding officer of his squadron, he was group adjutant for several months. Being an expert photographer, Captain McKinnon helped organize his group's first photo laboratory. He is the group photographic officer and also takes time to conduct classes in photography. Before joining the Army Air Forces in April of 1942, Charlie was a supervisor in the electroplating research section of the Du Pont laboratories in Niagara Falls, N.Y.

A letter from Raphael H. Courland, routed this way by The Review, reads as follows: "Concerning my service in the Army — I have been a second lieutenant in the

Sanitary Corps for the past five months and at present am stationed at Camp Plauche in New Orleans. I completed Officer Candidate School in September at Camp Barkeley, Texas, and was detailed to the Sanitary Corps; I was sent down to the School of Malariology, returned to the States, and was given a malaria control detachment. As it has been some time since I turned the pages of a Technology Review, it was with anticipation and pleasure that I sat down to the February issue a few days ago when I came in on leave. Thumbing through 'M.I.T. Men at War' reminded me that I hadn't notified you or others in a long time as to my whereabouts — hence this letter."

Another Army release brings news of the promotion of Charlie Wetterer, from the rank of major to that of lieutenant colonel. The Office of Public Relations of the Army Air Forces Weather Wing, Asheville, N.C., goes on to say: "Colonel Wetterer served for 20 months as subregional control officer for the weather service in Italy, Corsica, Sardinia, and Sicily and for 13 months as a weather officer in Bermuda. After returning from overseas in March, 1944, he attended Command and General Staff School and was for a short time acting regional control officer of the weather region with headquarters at Mitchel Field, N.Y., before coming to Asheville in September, 1944." Not so very long ago, Charlie was married to Paula Tuell of Montclair, N.J. — Olaf N. Rove is now making special studies of iron ore deposits for Pickands, Mather and Company of Cleveland, Ohio. He was formerly with the ferroalloy division of the War Production Board.

A release from an Eighth Air Force Liberator Station in England gives us the following information: Lieutenant General James H. Doolittle '24, commanding general of the Eighth Air Force, recently awarded the Bronze Star to Major Kenneth W. Root, Jr., of Cooperstown, N.Y., the base engineering officer of an operational heavy bombardment group. Mrs. Root is residing, during his absence, in Mansfield, La. Major Root was formerly employed by the Central New York Power Corporation as results and test engineer. He entered the service in February, 1941, as a private in the Field Artillery, and was commissioned as engineering officer on March 8, 1942. The Bronze Star medal was awarded to Major Root for his leadership and inventive ability in aiding the successful bombing missions of this group. He was engineering officer of one of the bombardment squadrons and accompanied the group to Africa and the Middle East on special missions wherein he contributed materially to the success of the aerial offensive against the enemy. The presentation was made by his commanding officer, Major Lawrence H. Humphrey, of Tulsa, Okla.

Another of our classmen has won distinction as described in the following excerpt from an Army release: "Captain John I. Herlihy, engineer officer of a squadron in the 100th Bombardment Group, has won the Bronze Star for outstanding achievement in keeping B-17 Flying Fortresses at peak efficiency in the air war against the enemy. Before entering the Army Air Forces, he was an industrial engineer for the Inland Steel Company of Chicago. Captain Herlihy directs his ground crews in the re-

pair and maintenance of the big Forts when they come back from sometimes grueling battles over Germany, with the occasional necessity of overhauling the flying battle-wagons, replacing engine wing panels, patching flak holes, and making other repairs. 'The old *Squawkin' Hawk* I was our most famous bomber — one of the first in the Eighth Air Force to complete 50 missions,' said Captain Herlihy. 'She had gone through one of the hardest periods in the air war without having a flier hurt inside her. We sent the *Squawkin' Hawk* back to the States for a bond-selling tour.' Other Fortresses in Captain Herlihy's squadron include the 68-mission bomber *Shilaylee*, which has been battered and blasted by flak but has always come back; *Once in Awhile*, which accomplished 45 missions without a mechanical failure; *Flat Foot Floogie*, which took her crews safely through 53 missions, and *Mismalovin*, a Fortress which limped back and, under the direction of the Medford engineer, was overhauled in 10 days with a supercharger, engine, seven gas tanks, wing panels, and other parts installed, and 500 flak holes covered over."

An interesting message from the public relations section of the United States Marine Corps gives the following news: Robert C. Demange, an engineering officer with a Fourth Marine Air Wing fighter squadron, told on his return from the Central Pacific of being wounded in the right leg by shrapnel during a Japanese aerial attack on Roi Atoll in the Marshalls last February. "I was supervising the unloading of aeronautical supplies that night when the Japs caught us flat-footed," said Lieutenant Demange, who was awarded the Purple Heart for wounds suffered. "Unable to find shelter, I threw myself on the ground; but I picked the wrong spot." Although his leg injury required medical attention for six weeks, Bob continued to perform his duties throughout the Marshalls campaign while his squadron helped neutralize enemy strength in the central Pacific. Earlier, says the release, he was based on Samoa and Wallis islands, where he supervised the maintenance and repair of his squadron's planes.

A recent letter from Jim Laubach, now in the Pacific, makes pertinent mention of the conspicuous absence of these news notes and mentions that not long ago he unexpectedly bumped into Fred Cooke. Fred is making air trips to several Pacific bases investigating procurement and setting up equipment. Lieutenant Laubach is looking forward to an early leave, which is about due, and has grape-de-vined that William Brewster, an Army major, will soon return from China to a possible wedding in Washington. — Finally, a brief note from the Alumni Association states that Will Jamison has gotten himself married and is living at that vaguely familiar address, 400 Memorial Drive, Cambridge. Lieutenant Jamison is at present stationed at the Boston Navy Yard. — We must also report on the marriage of Harlow Reed, an Army lieutenant, to Jacqueline de la Valtaire Smyth of New York. At last word, Harlow was scheduled to be in Boston attending the Civil Affairs Training School at Harvard.

And before closing may we remind you all that a letter, yes one, guarantees a

column and, while it's here, please note the address. — STUART PAIGE, *General Secretary*, 88 Van Giesen Street, Richland, Washington.

1941

A very interesting article in a San Francisco paper was entitled "Evict or Be Evicted" and subtitled "Hospitality to Veterans May Cost a Home." Apparently, a San Francisco couple has had two Army officers staying with them for the last year on a sublet basis without the approval of their landlord. The landlord lately found out what was going on and is raising a bit of a squawk. The young officers in question include one Charles Whitney, formerly of the Institute. My, what war will do — Charles, who used to be such a quiet boy, getting mixed up in all sorts of scandals! The engagement of Jane Gulielmetti to Arthur John Stevens was announced quite recently, as was that of Mary Barker to Harry Hamacher. Harry is doing research at the Institute. Phyllis Smith is engaged to George Vineyard. George received his doctorate in December, 1943, and is also doing research work at the Institute. Jane Huddleston became the wife of John Aaron, a lieutenant, stationed at Edgewood Arsenal.

Leo Alpert, a major, who was A.P.O.-ing out of New Orleans, is back at Asheville, N.C., with an air force weather group. Sherwood Burnett, we hear, is a major. John Porter is overseas with a Weather squadron. Harold Banks has received his gold leaf. Back in his home country of Turkey is Ziya Kirman. Our list of New York A.P.O.'s is swelling and now includes Ted Walkowicz, formerly at Wright Field, Bob Wooley, Jose Andino, Jim Cheek, John Knox, and Bob Blake. We shall have more to say about Bob later on. Our Wallace Blake is an air cadet at St. Mary's College in California. Ray Fernandez and Bob Rice are listing Washington addresses. Ed Hardway, also, is there at the Bureau of Aeronautics. Yeram Touloukian is out in La Fayette, Ind., and Doc Marple is down in Houston, Texas. We hear that Lars Nordenson has returned to Sweden. We imagine the Swedish-American Line is still a good address at which to reach him.

We received a letter from Joe Anthony and are quite tardy in submitting it at this time. Joe writes: "I am finally catching up on my contribution to the Alumni Fund and, having read the June Review, decided my annual letter would now be in order. As you may have noted, I am afloat on a tender, finally getting away from the chairborne infantry. In January or February, I don't remember which, I ran across Harry Rodin, who had just returned from a prolonged stay in the islands. He was soon followed by a girl (can't remember her name) who is now his ever loving wife in Washington, D.C. Also, Clem Burnap was at Mare Island in May learning drydocking and, in general, how to be a lieutenant, junior grade. At the time of my last letter I was in Key West, Fla. Since then I have had an addition to my family, Clifford Hugh, now one year old — quite a lad, too. I should like to hear from Roger Wiethoff, Walter Lob, and Teddy Walkowicz. Could the information be passed along to me somehow? We were the gang of Build-

ing 19, the headquarters of the Aeronautical Engineering Society and the old Franklin glider *Allaire*."

Another letter well overdue for this column is from Harry Wasserman: "I have been owing you a letter now for quite some time. I really have no excuse for not writing except, perhaps, that this lazy African weather has got into my bones and I intend to spend most of my spare time in the 'sack.' This is the universally accepted pastime over here on the Dark Continent. Then, too, I have been doing some traveling to stations in the Wing and have had extra work piled on me because of the malaria-lost man-hours. The work is the same as I have always been doing — training units in defense against chemical attack and handling problems of supply and policy incident to this job. It gets rather monotonous after two years, but as I'm always meeting new men and visiting new places, I can't kick! After the job is completed here, there may be a possibility of my leaving Africa, but until then I must stick it out — for several more months at least. The rainy season has now set in, bringing with it cooler weather, pleasant sleeping, and millions of bugs. I don't know why it is, but all the bugs in Africa seem to congregate in my barracks (two of the unnameable species were shown in actual size and shape) — these, plus the common garden variety of malaria mosquito, cockroach, and ant. Everybody over here is really sweating out that invasion, which has extra significance for us, meaning that we get home that much the sooner. It isn't that we are very badly off over here, or lack comfort, but you get a little tired of seeing women in magazines only. I met a Tech man recently, to our mutual delight. He is John Martin, a captain in the Air Forces, and of the Class of 1940 in Business Administration. He is working in Operations at present out on the line on a tour. Johnny and I plan to celebrate our own Alumni Day next month. We shall probably call in the natives and have a palm wine shindig. That's about all for now, Stan. I'll be seeing you."

Among the letters which we have been keeping to ourselves for too long a time is one from Bob Blake, who has been in the European theater since the landings in North Africa. "Much water," he says, "has gone over the proverbial dam since I last wrote. Most important of all: I married Lindsley Brown of Washington on September 24. I had just completed two and a half years overseas when I suddenly received orders to proceed to the United States of America without delay by the fastest possible means. I carried out those orders with dispatch, left Paris on September 16, and arrived in Washington, D.C., on the 18th. I managed 18 days of leave, and Lindsley and I tied the knot at All Souls Church in Washington. A boyhood chum and old friend, Thomas Alexander, a lieutenant, junior grade, was best man. Al Bowker came down from New York City. We hied us away to Charlottesville, Va., and after some other travels settled down in Washington. I need not say that it was like a dream. Duty called, however, and I left Washington on October 12 to return to France. You can imagine my feelings at the plane. It took a bulldozer pushing flat out and a company of M.P.'s, but I was finally

put on board. So here I am. My job is interesting, and that completes my tale. Before I went home I chanced on Howard Samuels in Paris. He is a major, you know, and working in the Quartermaster section of one of the armies. We exchanged stories over a brandy and both went on with our travels. Howie looks fine and hasn't changed at all since I last saw him. On my way back to France, I stopped off in New York long enough to have lunch with Al Bowker. He has taken on quite a bit of weight and looks in the pink. While visiting Walter Keith's parents, I talked by long distance to Walt, who is still at Southwestern Proving Ground in Arkansas. He had only recently received a promotion to captain. Snow is on the ground here and, as one shivering Texan I knew said, 'when water freezes, it's cold.' My travels have taken me to new lands. In addition to Morocco, Algeria, Tunisia, Egypt, Sicily, and Italy, I now add the United Kingdom, France, Belgium, and Holland. I managed to have a reunion last month with my brother, he of the paratroopers. We met in Nijmegen, Holland, and spent an evening spinning yarns. The end of the war occupies all minds, naturally, and the tough fight remaining is obvious. In those who carry the fight to the enemy personally, one finds a calm confidence, but a sober view of the future."

We received a fairly long news release from Leyte in the Philippines concerning John Macleod, and we are going to quote it for you rather than attempt to use our own poor style and spoil its wording: "For meritorious achievement" while participating in more than 150 combat missions over enemy territory, Captain John H. Macleod, Jr., of 609 Wayne Street, Sandusky, Ohio, has been awarded a bronze Oak Leaf Cluster in lieu of a second Air Medal. Macleod, a liaison pilot with the 11th Airborne Division, was one of six Cub plane fliers when they supplied an entire regiment by air. It was the first time that the tiny 'jeep' planes, usually used for artillery-spotting purposes, had carried supplies on anything approaching this large scale. Together with his fellow pilots, Macleod has been given much of the credit for the success of the initial Philippines campaign.

"The drop zone over which Macleod parachuted his supplies was a pocket-sized airstrip which had been hacked out of the jungle atop a mountainous plateau by airborne engineers. 'It took us only ten minutes to fly from our rear base to the tiny airstrip where we dropped our load,' Macleod said, 'but it took foot soldiers nine hours to hike the same distance through the thick, muddy jungle, and they couldn't carry a load. Often Jap patrols which infested the area took pot shots at them with rifles and, frequently, machine guns. Nearly every plane they used,' he added, 'is spattered with dime-sized holes which have been patched. They never shot any of us down, and we didn't mind it because we had so much fun getting even. We'd take a few hand grenades with us before we left for a mission and, after we'd dumped the supplies, we'd go Jap hunting. The usual procedure was to fly at treetop height over an area in which we knew Nips were located. At that altitude they couldn't spot us until we were overhead, and then it was

too late. We'd heave our grenades, and they'd scatter like girls in a man's locker room. It was lovely.'

"Because of the heavy fog which rolled over the mountains and, at intervals, obscured the strip, it wasn't always possible to fly the supply missions continually, Macleod said. 'We'd wait for a break in the weather,' he explained, 'and then make our milk runs as fast as we could fly them. At the rear base we'd load up with ammunition or rations or medical equipment or whatever the load happened to be, take off, and a few minutes later we'd be back for another load.' There are two types of 'jeep' planes: the Cub, carrying small cargo which was shoved over the side by the pilot when he reached the drop area; and the L-5, a Stinson-built aircraft, which carried two persons — the pilot and the passenger, who pushed out the parachute load at a signal from the flier. The L-4's, the Cubs, were able to land on the small strip because of their slower speed, and they evacuated dozens of paratroopers who had been wounded in patrol actions. Many a critically injured soldier owes his life to a Cub plane which returned him to a base hospital in the rear.

"Macleod, who is a 1941 graduate of Technology, had his closest brush with the Japs on December 6, when the Nips made a paratrooper attack on Macleod's own airstrip. 'We were eating supper one night when suddenly we heard the roar of planes overhead,' Macleod said. 'I didn't pay much attention to it, especially when someone said, "They're C-47's." But a second later a bomb hit a gasoline dump located nearby. There was a huge explosion and, of course, we all ran outside. Then we saw that the planes were Nip transports, which are almost exactly like the C-47's. One of the planes was afire,' Macleod continued, 'so a sergeant and I rushed over to save it. I was puzzled to find the fuselage burning only in spots, until I realized that phosphorus, which will burn through skin and bone, was falling all around us. About that time the Nip planes flew through the ack-ack again, and from each ship dozens of parachutes billowed open. Everyone opened up on them, but most of the Japs landed unhurt. Together with 20 other men,' Macleod added, 'I smoked for a spider trench. The only weapon I had was a .45 automatic pistol, and the rest were in about the same fix. The Japs, all this while, were running around like a bunch of wild Indians, looking for us. They were screaming and yelling silly things like, "All is resistless — surrender." At nightfall, Macleod said, the 20 Yanks made their way to an adjoining airstrip, where they stayed until morning. At sunrise an American counterattack was launched, and the 200 Japs were killed, with the exception of a handful who were driven into the hills to starve.

"After receiving his civil engineering degree from Technology, Macleod spent nearly a year in the Panama Canal Zone, where he designed bombproofing equipment. In July, 1942, he was called to active duty as a reserve officer, and in the following November he was accepted for Artillery pilot training, in view of his civilian flying experience. After completion of the flying school at Fort Sill, Okla., Macleod served as an instructor for 10 months, after which

he was assigned to the 11th Airborne Division as liaison pilot. A veteran of 1,200 hours in the air, Macleod has flown more than 300 hours since coming overseas, of which 150 were over enemy-held territory." — STANLEY BACKER, *General Secretary*, Philadelphia Quartermaster Depot, 2800 South 20th Street, Philadelphia 45, Pa. JOHAN M. ANDERSEN, *Assistant Secretary*, 12 Ware Street, Cambridge 38, Mass.

1942

Seng-chiu Hu is evidently making quite a name for himself on the West Coast, having founded an airplane plant completely owned and operated by the Chinese — so I guess our Doctor rates a big bouquet for his excellent work. Bill Schoen is now a captain and commander of an Eighth Air Force squadron based in England. Apparently the Army and Bill get along pretty well. In the naval department we have just had a letter from J. T. Coe. As of the early part of March, he and Peggie were having fun in California, while Jerry's destroyer was waiting to put to sea again. Carl McGinnis visited us recently during a three-day leave. He is stationed for the present at Patuxent River, Maryland. His stories of action in the Pacific, about which we have already had something to say, were a lot better at first hand from Carl himself.

Whom should we meet the other night in the Alumni Pool but Bill Denhard. He has been in Boston now for a month or so and plans to stay here indefinitely working for Allis Chalmers. He is still looking around for some Course VI men, having seen none in his past three years of wandering. At present he is living in the Phi Kappa House, which would indicate that he is still a likely catch for some prowling female. Other bits of news from the civilian record show that Al Hayes has been promoted to the position of engineering records supervisor and consulting engineer to the patent department of the Hazeltine Corporation. If the job is as important as that mouthful of words, Al is really doing all right. Dick Malone, having been given a medical discharge from the Army, received an M.D. degree from the University of Pittsburgh school of medicine last September and is doing his internship at the medical center there.

On to the lighter vein, and we see that only three of the noble members of the Class have succumbed to the wiles of femininity. Brad Darling and Ann Marsters (a SPAR, no less) have signified their intentions, as have Bob Vyverberg and Dorothy Quigley. The last of the trio is none other than Dan Hulett. And the future Mrs. Hulett is Sarah Eschan of Charlestown, W. Va. Dan is still down there with Carbide and Carbon, but you wouldn't know it from his letters. The only dope we have gotten on our Charlestown alumni group so far has been via the newspaper columns. What's going on down there, anyway? So far, the only ones I am sure are down there are Dan Hulett and Mal Anderson. — FREDERICK W. BAUMANN, JR., *General Secretary*, Orchard Lane, Golf, Ill. S. YOUNG TYRRE, JR., *Assistant Secretary*, Room 2-215, M.I.T., Cambridge 39, Mass.

1943

"For gallantry in action on the field of battle on October 8, 1944," reads his cita-

tion, G. H. Miller Smith, a lieutenant in the Army Engineers, was posthumously awarded the Silver Star. "Lieutenant Smith, a platoon leader, was assigned the mission of destroying by demolition a bridge across a river in enemy territory. As the demolition was to be done at night, Lieutenant Smith made a daylight reconnaissance accompanied by an enlisted man and worked his way to a point about 500 yards southwest of the bridge. The enemy placed small arms fire upon his position, but instead of withdrawing, he crawled forward alone, neutralizing several enemy positions with accurate rifle fire, and captured six Germans. As he withdrew with his prisoners, he was mortally wounded by fire from a concealed enemy position. Lieutenant Smith's courage, coolness, and zealous devotion to duty reflects the highest credit upon his character as an officer and upon the military service."

Apologies are certainly due from me for having missed an entry in the class notes for these last two months. I suppose I could blame this omission upon the former Miss Betty Williams, who on February 24 became Mrs. Clinton C. Kemp, but in actual fact, it is because I have had a change in military station. At the risk of recording some news that you already know, I shall therefore include everything which has come to my attention during these past three months.

Shakespeare's much quoted words, "Sweet lovers love the springtime," aptly describe the recent state of affairs. We take pleasure in recording that the former Virginia Finlay of Port Washington, Long Island, and Dave Moyer were married on March 3, and a month earlier, Jewell Margaret Dockery became Mrs. Louis de Frate in Jacksonville, Fla. Then, too, we have noted several engagements: notably those of Joan Goodnow and Jack Karstrom, a lieutenant, junior grade; Elisabeth Alden Wilson and Charles Woods, a midshipman; Phyllis Louise Pollock and Eugene Magat; Marilyn Golinko and Harold Gershenow, a lieutenant, junior grade; Virginia Nelson and George Marakas; Jane Isabel Tennent and Paul Anbro; and lastly, Joan Isobel Vitkin and Ray Frankel, a lieutenant, junior grade.

To the mailbag! From Hans Haac we have the following, dated at sea: "Again I saw my name in The Review; this time I am really traveling toward points unknown. My ankle did not turn out 100 per cent and sort of shattered some previous hopes. Otherwise, I am feeling fine, not even the ocean affecting that. I had a letter some time ago from Larry Stewart, who is still at Norfolk, and once in a while I hear from the John Scotts."

Also by V-mail and possibly also from sea, Bill Selke tells us that he is "just back from inviting Bob Metzger to dinner at our PT squadron wardroom. Bob, who is with an amphibious group, is probably a jay-gee (he doesn't like collar devices). He told of having a reunion with Big Jim Spitz, Jack Karstrom, and Doug Scott at Pearl Harbor. Frank French, now with a torpedo squadron, and Howie Bollinger, attached to a destroyer escort division, were classmates of mine at the Naval Training School at M.I.T. Advise Class of '47 against splinter craft."

This further news from Frank French came in a letter received recently: "Much has happened since the days of Course X-C. As you see, I'm with a torpedo bomber squadron. . . . The work is very interesting and technical enough to give an engineer something to sink his teeth into. Right now, I'm sitting on an island in the Pacific but haven't seen any action. Before coming out here, I spent most of my time at airfields on the East Coast. While at Otis Field (Camp Edwards), I ran into Bob Kelso, a lieutenant, junior grade, attached to the carrier aircraft service unit there as engineering officer. Ray Frankel, also a lieutenant, junior grade, bumped into me one week end in New York. He was then a naval instructor at Princeton. I haven't yet run into Jim Spitz or any of the others out here in the Pacific, but as Tech men turn up everywhere, I probably shall."

While I was still a courting man, I ran into Jack Collins on a Washington train bound for New York. After considerable sales talk, I inveigled him into writing me the following note: "I have been in the Navy about nine months and am now in the radio materiel school at Bellevue. The going is tough, but the work most interesting. When we are finished, we shall be expected to service any and all types of radio, sound, and radar equipment. That is a large order, particularly when one has avoided radio in earlier life as carefully as I did! We spend a total of 11 months at the job. I shall have finished about August 1. Then I expect to get some salt in my bones. As things pop so quickly these days, perhaps I should explain that I am still a bachelor, and I live with my family. I saw Gil Graves a week ago but didn't get a chance to talk to him. He's an ensign and, after exhaustive training, is on his way, I think, 'down to the sea in ships.' I am working with Art Powell. I heard from Betty Fallen that she is no longer with the Athletic Association at Tech but seems happy."

More news of Gil Graves and others comes from Lieutenant Hugh Pastoriza: "Matt Long shipped out to Camp Beale a few weeks ago and by now is probably somewhere in the Pacific. Gil Graves is a lieutenant, junior grade, as of March 1. I received a swell letter from him from California. By now, he's somewhere in the Pacific in something called a jumper unit. The last I heard from Cal Dunwoody was that he was somewhere in France, heading for Germany in the French unit of the American Field Service. As you know, he got home only last fall after having served under the British in the A.F.S. in Burma and India for about 14 months. Dick Haas came in last Sunday from Chanute Field, Ill., to begin a 15-day leave. He's still eager to fly a fighter but fears he will end up in a B-29. He looks wonderful and has gained 20 pounds. He was very happy to hear about you and Betty and said to give you his best when I wrote. I don't know whether you know Frank Smith. As he is down here with me, anything I say about myself applies to him also. I have finished radar school and am now taking a short course in identification of equipment."

Roll out the carpet; raise the flag; play the band! At long last, Ensign Bob Rorschach has broken down and written us: "You should find this a rather unusual letter!

It's the first I have ever sent in to you, and I have hardly anything to talk about. I am not engaged or about to be. I have run into no one from our Class or even from the Institute, and my own adventures are hardly worth mentioning. My chief reason for writing this is to let anybody who cares know that I am still alive. I will admit to some pretty extensive travels since I left Du Pont and joined the Navy. I got my commission from the *Prairie State* in New York; went to Harvard and Tech for special training, and was then sent to Mare Island Navy Yard. From there, I went aboard a ship and have been on the go ever since. San Francisco, San Pedro, San Diego, Seattle, Pearl Harbor, and Eniwetok in the Marshall Islands are among the places I have visited. My duties consist mainly of standing watches and keeping the radar equipment operating. There is not much excitement in it, although I sometimes get a bit of satisfaction out of solving a particularly pesky maintenance problem."

From Andrew Bariuchok we have the following: "I was an aviation cadet last June when the Navy decided to decrease the amount of pilot training. (I had just completed preflight at Chapel Hill.) I requested transfer to V-7 midshipman training and, after 37 days of leave, finally arrived at premidshipmen's school in Asbury Park, where we spent 11 weeks of leisure and boredom. The worst part of it was the food. We also happened to be there during the hurricane in September, which added some excitement and some extra shore patrol duties to our regular daily routine. But in general, none of us liked the place very much. Early in November, we split up and went on to midshipmen's schools all over the country. I was lucky to be sent to Columbia University right in my home town. But the blow came when we were restricted to the campus during the first month, which was our period of indoctrination. Now we have 27 hours of liberty every week end if we don't draw a watch. On New Year's Day we were informed that the Navy was increasing its pilot training again and will give some of us a chance for flight training after graduation." Today I received a card from Andy saying that he is now in Ottumwa, Iowa, where he is receiving flight training.

Bernard Dale writes: "I flew back East to Washington, D.C., for two weeks and was in New York for two days last March. This was my annual vacation. I had dinner with Frank Clauson at the University Club of Los Angeles just before Christmas. He is a process engineer for the Texas Company at their Wilmington refinery about a mile from Shell's, where I am located."

And finally, Ray Richards, a Marine Corps lieutenant, says: "I have moved around a bit since I last wrote you. I left the Institute in December and went to Camp Lejeune, N.C., for a two months' course. Golf was not in the curriculum, but I learned to play and got out almost every week. Our winter was as mild as Boston's was severe. At present I am at the Marine Corps air station here at Cherry Point, waiting assignment. I expect to go to Corpus Christi next week for temporary duty. After that it is anyone's guess where. Last week end I made a hurried trip to Washington and had a very pleasant time with Al Shairman and his wife, Doris. Al

is doing mechanical design in the Naval Ordnance Lab. While there, I also talked with Sam Fry '41 and Andy Hillhouse. Sam is doing work on mine development while Andy, in true Course XV fashion, is doing procurement work and studying law at night. All three have recently been made ensigns. I have had a letter from Stan Porosky written in the 128-degree heat of New Guinea. Stan is self-styled 'dean of students' of a school he has started in order to break the boredom. His courses include 'everything from calculus to psychology.'"

This entry will be our last until next fall. So till then be good, stay sober, and let me know what you are doing from time to time. Cheerio. — CLINTON C. KEMP, *General Secretary*, Barrington Court, 988 Memorial Drive, Cambridge 38, Mass.

1945

Word has been received that Robert J. Solow, an infantry sergeant, was killed in action in France on February 4. Harold A. Steiner, a lieutenant who joined the Air Forces after his sophomore year, was shot

down and taken prisoner in Germany on October 7, after having completed some 50 missions as a navigator on a B-17. Walter J. Freund, Jr., an infantry sergeant, has been missing in action in Belgium since January 7. Walt had joined the Army in February, 1943.

Wallace A. English, a private, first class, was recently awarded the Silver Star for gallantry in action in Germany. Wally had taken part in the rescue of eight injured men isolated by a mine field and machine-gun fire. Stephen B. King, a cadet in the Coast Guard, has apparently been getting wide experience in the ways of the sea at the Coast Guard Academy at New London, where he has earned a varsity letter on one of the most successful swimming teams the Academy has had and has become a leading helmsman on the dinghy sailing team.

So much for the military news concerning our classmates; now on to the other great nemesis of the Tech man, matrimony. As mentioned last month, John Granlund, an ensign in the Naval Reserve, was married in Bronxville, N.Y., to Vera Ione Ray-

mond. Johnny is now stationed at Bowdoin College, Maine. Frank Pohanka, likewise an ensign, was married soon after receiving his commission at Columbia University. His bride was Elaine Burkhardt, and the ceremony took place in New York. Ensign Donald A. James also shared in the parade to the altar with his marriage in Plainfield, N.J., to Margaret Ann Gloeckler. The Jameses are now living in Washington, where Don is taking a special training course. Charles Smalzel, a lieutenant commander in the Navy, who has been stationed at M.I.T. for instruction in Naval Architecture, was recently married to Virginia Hall in Needham, Mass., and Bob Benedict has signed up to take the fatal step with Dorothy Burdick of Brookline, Mass., who is a granddaughter of our own Professor Charles E. Locke '96. — JAMES S. MULHOLLAND, JR., *General Secretary*, 1172 77th Street, Brooklyn, N.Y. *Assistant Secretaries*: RODERICK L. HARRIS, 1 Winchester Street, Brookline 46, Mass.; JAMES B. ANGELL, 530 Beacon Street, Boston 15, Mass.

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